THE IRON TRADE REVIEW

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Car Shortage May Become Serious

One Furnace Compelled to Bank Owing to Slow Movement of Coke—More Advances in Prices of Pig Iron and Finished Materials

EMBARGOES declared against shipments from the central west to the seaboard by several railroads and a shortage of cars in different districts are becoming a serious factor in the iron market. One New Jersey furnace has been forced to bank, owing to delay in shipments of coke, and other furnaces will be compelled to suspend unless there is improvement soon.

Iron Ore

The buying of a lake steamship by one ore company and negotiations for the purchase of a number of other vessels are intended to insure shippers enough vessel tonnage to move ore to be mined for next year's delivery. Some contracts recently made for the transportation of ore provide for the vessels going up light in order to expedite the ore movement and this fact is likely to cause trouble for the shippers of coal.

Pig Iron

A shortage of iron is threatened in several districts, particularly at Buffalo, where a few sales of small tonnages have been made as high as $20, furnace. The supply of bessemer is very limited and some holders are asking $20, valley. Foundries report that their melt is increasing rapidly and some of them are having difficulty in placing orders for additional tonnages. Some sales of pig iron during the past few days were from stocks bought a number of months ago for speculative purposes. These sales were made at an advance of about $5.50 per ton over prices paid. In the south, $13.50 can still be done for No. 2 foundry, but the tonnage to be had at that figure is small.

Machinery

Foreign demand for machine tools is still brisk and some orders for export during the next two or three months are being placed. The Bethlehem Steel Co. is buying to replace machines damaged by the recent fire at one of its machine shops. In spite of the high prices prevailing, railroads have bought more freely during the past week. Ship building companies have also been prominent in the market. Important additions to plants are being made in the Pittsburgh district.

Wire Products

Another advance of $2 per ton has been made on wire products and plain wire is now quoted at $1.85 per 100 pounds and wire nails at $2 per keg. Some companies are entirely out of the market. Demand continues active.

Scrap

Buying of heavy melting steel scrap has been extremely heavy during the past week, especially in western Pennsylvania, where transactions footed up to about 300,000 tons. Prices of scrap in all leading centers are tending upward.

Plates and Shapes

Leading eastern Pennsylvania platemakers have advanced quotations on plates from $3 to $5 per ton. A number of plants in the central west are selling at 2.25c, Pittsburgh, for ordinary business for prompt shipment, and as high as 3c is obtained on small quantities. At least one of the leading companies is, however, able to deliver in about six weeks at 1.70c, Pittsburgh. In eastern territory, the principal tonnage pending is for elevated and subway work in New York, of which 46,000 tons have just been awarded to the American Bridge Co., while bids on 29,000 tons have been received and 25,000 tons remain in the market. Bethlehem sections are being delivered in about six weeks, but it is difficult to obtain standard sections in less than three months.

Warehouse Prices

Warehouse prices have again been advanced in New York, Cleveland, Chicago, Buffalo, Cincinnati and other centers on shapes, plates, bars, sheets and shafting, the advances ranging from $1 to $5 per ton and most of them being $3. The demand from warehouses continues at a record-breaking rate.

MEN OF MACHINERY TRADE

Who they are Where they are What they are doing

Charles M. Schwab has accepted a membership in the board of trustees of Cornell University.

Grayson M. P. Murphy has resigned as receiver of the International Steam Pump Co. and this action has been accepted formally by the court.

William Lodge, president of the Lodge & Shipley Machine Tool Co., was operated upon recently for cataract of the eye. The operation was successful.

Morton S. Newhall has become associated with Robert C. Lea & Co., 21 South Twelfth street, Philadelphia, dealers in pig iron, iron ore, coal and coke.

Guy E. Tripp, chairman of the Westinghouse Electric & Mfg. Co., has been added to the board of directors of the American International Corporation recently formed to exploit the foreign trade of this country.

William P. Palmer, president of the American Steel & Wire Co., Cleveland, has been appointed by Governor Willis a trustee of the Ohio Archaeology and Historical Society to succeed Hon. Myron T. Herrick, resigned.

D. Newton Barney, Farmington, Conn., has been elected director of the Colt's Patent Firarms Mfg. Co., Hartford, Ct., to fill the vacancy caused by the death of Sylvester C. Dunham.

John D. Hibbard, Chicago, commissioner of the National Metal Trades Association, addressed the Worcester, Mass., Ministerial Association, Nov. 22, on the causes of strikes. He favored the open shop and opposed the principle of collective agreements.

Harry Parrock, formerly identified with the operating department of the Republic Iron & Steel Co., Youngstown, and James H. Nutt, secretary of the Western Bar Iron Association, have been appointed service director and safety director, respectively, of Youngstown.

John W. Harrington, of the Harrington & Richardson Arms Co., Worcester, Mass., is planning to make another trip to Europe after the Christmas holidays and will pass most of his time in Paris. This will be his third trip abroad since the outbreak of the European war.

Masashi Nagao, chief chemist of the Mitsubishi Paper Co., Hiago, Japan, visited the plant of Rice, Barton & Fales, Worcester, Mass., last week and placed an order for machinery. He will place orders for additional machinery elsewhere during the next few months..

C. Orghidan, chief engineer of the Roumanian government, is now in this country arranging for the purchase of machine tools.

J. F. White, former purchasing agent of the Metal Products Co., Detroit, has accepted a similar position with the Anderson Forge & Machine Co., of that city.

Charles W. Francis, formerly assistant superintendent of the Robbins & Myers Co., Springfield, O., has been appointed general superintendent of the Ahrens-Fox Fire Engine Co., Cincinnati.

T. H. Hermanson, for several years past connected with the Epping-Carpenter Pump Co., Pittsburgh, has resigned to accept the position of superintendent with the Blake & Knowles Steam Pump Works, Cambridge, Mass.

Halbert P. Hill, prominent in the early development of the rotary converter and allied apparatus for the conversion of alternating into direct current, is now connected with the C. & C. Electric & Mfg. Co., Garwood, N. J.

George E. Holmes, formerly chief draftsman and mechanical engineer for the George P. Clark Co., Windsor Locks, Ct., and for many years with the Kidder Press Co., Dover, N. H., is now in charge of the drafting department of Schaum & Uhlinger Philadelphia.

Frederic H. Poor, who since the incorporation in December, 1909, of the S. K. F. Ball Bearing Co., New York, has been its general manager, has recently severed his connection with that organization, and has opened an office of his own at No. 30, Church street, New York.

George C. Green, foreman of the handmilling department of Colt's Patent Fire Arms Mfg. Co., Hartford, Ct., who has been in the employ of the company 51 years, has been presented $75 in gold by the men in his department to mark the completion on his part of over half a century of service with the company.

Allen L. Corey, son of Wm. E. Corey, chairman of the Midvale Steel & Ordnance Co., will serve on the directorate of the Penn Marine & Ordnance Castings Co., Inc., which recently was formed to merge steel castings plants along the Atlantic coast. Other directors are as follows: Rodney Thayer, Harvey D. Gibson, J. E. Richards, Ivers S. Adams, C. Ferris Jemison, Lewis L. Dunham, Henry J. Fuller, Walter F. Bickley and Ernest du Pont.

Dr. John A. Brashear, president of the American Society of Mechanical Engineers, and a prominent scientist, was tendered a banquet and reception at the Soldiers' Memorial Hall, Pittsburgh, Nov. 25, the seventy-fifth anniversary of his birth. Much to Dr. Brashear's surprise, he learned that provision had been made for a $50,000 endowment, to be known as the John A. Brashear fund, to stimulate interest in scientific subjects. A large loving cup was presented him. Charles M. Schwab, one of Dr. Brashear's warmest friends, referred to him as "the greatest man I ever knew", in paying tribute to the scientist at the close of the dinner.

Herbert F. Black, who last week was elected to the directorate of the Cambria Steel Co., Johnstown, Pa., has been with the Cambria company since 1912, in the capacity of ore agent, with offices at Pittsburgh. He is in charge of the production and shipment of materials entering into the manufacture of the company's products, including ore, coke, limestone, coal, ferro-manganese, spiegel, etc. Mr. Black is one of the most prominent members of the iron and steel trade in the greater Pittsburgh district. Before becoming identified with the Cambria company, he was connected with the Carnegie Steel Co. for 15 years, having been associated with D. G. Kerr, vice president of the United States Steel Corporation, who was ore agent for the Carnegie Steel Co. prior to 1909. Mr. Black is vice president and director of the Cambria Steamship Co., the Mahoning Steamship Co., the Penn Iron Mining Co. and is a member of the executive committee and a director of the Mahoning Ore & Steel Co., all subsidiary interests of the Cambria concern. He is a member of the American Iron and Steel Institute and of the Duquesne Club, Pittsburgh.

November Shows Good Tool Sales

Orders for Machine Tools Continue Heavy But Deferred Deliveries Prevent Placing of More Business—Railroads Enter Market and Buy Heavily

NOVEMBER was another month of activity in the machine tool market. With the exception of the purchases of a few domestic manufacturers of war munitions, however, the business was of a more scattered nature than during the feverish first half of the year. The passing of the crest of the wave of war buying was due, not so much to a falling off in requirements, as to the difficulty in getting early deliveries on machine tools. Practically all lines are sold up, at least to some extent, for future delivery, while lathes, particularly the larger sizes, suitable for shell-making, are sold up from four to six months ahead. Some makers now have accepted lathe orders for delivery in August of 1916. The machine tool makers during the month showed increasing indifference toward quoting on new business, due not only to their already thoroughly sold-up condition, but to factors of uncertainties, such as labor troubles, affecting the question of production.

Large Buyers of Month

AMONG large buyers of machine tools were the Midvale Steel & Ordnance Co., the Chester Engineering & Ordnance Co., Chester, Pa., and the General Railway Signal Co., Rochester, N. Y. The latter concern purchased equipment involving an outlay of probably more than $200,000. This equipment will be used in turning out 9-inch howitzers and other war munitions on a contract booked recently through J. P. Morgan & Co. The Midvale company placed heavy requirements, involving chiefly lathes of the larger sizes. The Chester company placed an order for 330 tools with the Cleveland Machinery & Supply Co. Additional orders were placed by numerous munition manufacturers who have been almost constant buyers since last fall. The General Electric Co., Lynn, Mass.; International Steam Pump Co.; American Brake Shoe & Foundry Co.; Remington interests; E. W. Bliss Co.; Baldwin Locomotive Works; Nathan Mfg. Co., New York; Crocker-Wheeler Co., Ampere, N. J., and many other munition makers placed orders which involved a large total. Most of this business called for deliveries in three or four months. New munition contracts were not reported as freely in November as in preceding months. In addition to the contract obtained by the General Railway Signal Co., Rochester, the East Iron & Machine Co., Lima, O., was awarded a contract for cartridges, involving about $2,500,000; Blair & Co., New York, purchased the plant of the Davis Sewing Machine Co., Dayton, O., to turn out large war orders; the Motsinger Device Co., Lafayette, Ind., received a contract for 1,000,000 time fuses, involving $2,500,000, and the Minneapolis Steel & Machinery Co. took a contract for 6-inch shells. Foreign demand continued active and commissions representing the foreign countries, as well as representatives of foreign concerns, scoured the market for lathes and other equipment for the earliest shipment obtainable. Included in the business placed for export were several large lots of shrapnel-sized lathes. The foreign buyers bid eagerly for all second-hand lathes offered and, as a result, dealers were unusually active in collecting used equipment. In this connection, the equipment of the Calumet Machine Co., Chicago, was bought by a Chicago dealer, about 37 tools being involved. These found immediate purchasers.

Railroads Enter Market

DOMESTIC demand from concerns other than those manufacturing war munitions continued to improve during the month. The railroads especially came into the market on a more extensive scale. Among those which placed important orders were, the Rutland; Chicago, Rock Island & Pacific; Chicago, Milwaukee & St. Paul; Norfolk & Western; Baltimore & Ohio; Illinois Central; Lake Shore & Michigan Southern; New York, New Haven & Hartford, and others. The railroads continue to inquire actively and more business from these interests is expected. The ship building companies, particularly those on the Atlantic coast, also furnished some good buying. Manufacturers of railroad equipment also were important buyers, particularly the Baltimore Car & Foundry Co.; Standard Steel Car Co.; Pressed Steel Car Co., and American Car & Foundry Co. A large amount of buying also came from automobile manufacturers, particularly those in the Detroit district. The Packard Motor Car Co. issued a big list. Among the automobile manufacturers who placed large orders was the Simplex Mfg. Co., New Brunswick, N. J. A big buyer during the month was the McClintic-Marshall Co., which will erect a large new fabricating plant at Pottstown, Pa., to replace its present plant there. The company placed an order for a large amount of punching and shearing machinery, for about 28 cranes and for other equipment. Demand for cranes continued heavy during November and a large amount of business was booked. Crane makers now are well provided with orders and have advanced their prices on an average of 10 to 15 per cent.

Forms Big Merger

AN IMPORTANT development during the month was the purchase of two of the largest manufacturers of multiple spindle automatic screw machines, the National-Acme Mfg. Co., Cleveland, and the Windsor Machine Co., Windsor, Vt., by R. B. Phillips and associated interests. Mr. Phillips, who is treasurer and general manager of the American Steam Gage & Valve Co., Boston, is preparing to merge the American Steam Gage & Valve Co., Boston; the R. B. Phillips Mfg. Co., Worcester and Lowell, Mass.; the New England Steel & Ordnance Co., and the Windsor and National-Acme companies into one ownership, to be known as the Phillips Corporation. It is understood the Windsor and National-Acme companies will continue to take miscellaneous business, as usual. Several new lathe concerns were organized during the month. Included among these is the American Lathe & Press Co., with $1,500,000 capital, which is expected to buy the Richmond, Ind., plant of the Rumely Co. A. W. Whitcomb, formerly of the Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass., has started a plant at Worcester for the manufacture of lathes.

Coke is Quiet

And Furnace Grades Are Irregular—Production is Increased

Pittsburgh, Nov. 30.—The market for beehive oven coke has failed to show any recuperative ability, although dealers appear more sanguine about the future. Furnace fuel, both for prompt and future delivery, is selling at relatively low prices. Despite strength reflected by the market for pig iron, Connellsville coke continues to drag, being both weak and irregular. Fuel for spot delivery is being offered at $2.25, ovens, and less. Seventy-two hour coke, which is in good demand, is selling at a range from $3 to $3.25, ovens. The observance of the holidays in the regions together with unfavorable weather conditions, which probably will be confronted the next couple of months, undoubtedly will curtail coke production to a considerable extent. If such proves to be the case, prices probably will advance. *The Connellsville Courier* for the week ending Nov. 20 says production was 433,402 tons, an increase of 6,021 tons, compared with the week previous. Several operators, who adopted the policy of preparedness in anticipation of the holiday demand now find themselves with surplus tonnages on their hands.

New Alligator Shear

An alligator shear, equipped with an automatic stop, and designed for use in large warehouses and mills for cutting bars, angles, flats and rounds, has been placed on the market by Doelger & Kirsten, Milwaukee. This shear is manufactured with 12-inch, 18-inch, 21-inch or 24-inch knives. The automatic stop which performs its function at the completion of each revolution is released for the next cut by pressure on a foot lever. To obtain continuous action, the foot lever may be locked, thus disconnecting the automatic stop. In the accompanying illustration is shown the firm's shear for rounds and squares 2¾ inches in diameter. This tool is made entirely of steel castings and is actuated by a 7½-horsepower motor. Weighing approximately 8,500 pounds, it is said to have a capacity of 40 to 45 cuts per minute.

Wire Company Improvements

New York, Dec. 1. (By wire.)—The American Steel & Wire Co. will expend about $3,000,000 for improvements to the Cuyahoga works, Cleveland. These will include two rod mills, one for rounds, the other for flats and a new wire mill. The Steel Corporation continues to make appropriations for important improvements and the total of these recent months is now around $40,000,000. No action has been taken concerning the building of the Ojibway plant.

Pig Iron Rates Advanced

Washington, Nov. 30.—Increases of 5 per cent in the rates on pig iron from Virginia furnaces to Pittsburgh and Pittsburgh rate points and to 22 points in West Virginia will become effective on Dec. 29, according to an opinion handed down today by the interstate commerce commission.

Embargoes

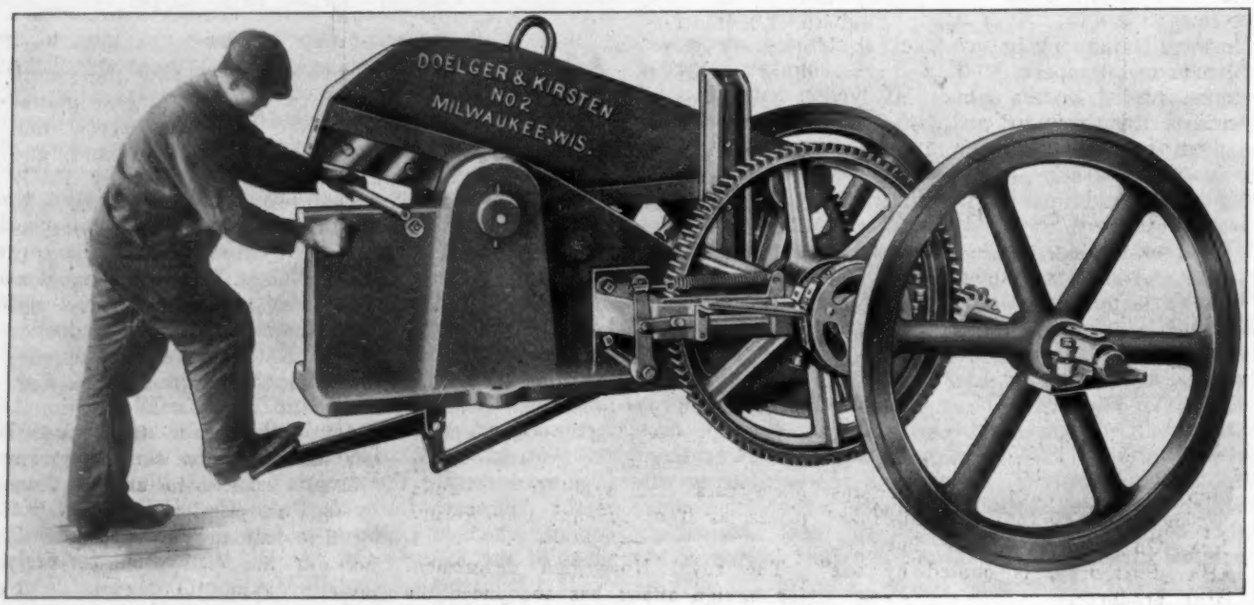
Declared by Railroads in East Causes Much Embarrassment

Declaration by eastern railroads of embargoes on export freight, now are being forced by the tremendous rush of foreign shipments and the serious congestion that at present prevails at Atlantic ports, particularly New York. The Baltimore & Ohio railroad has embargoed all iron and steel shipments through New York because of the inability of the yards at St. George, S. I., to handle additional consignments. The Delaware, Lackawanna & Western railroad has placed a general embargo upon export freight of all classes at New York, while the Pennsylvania railroad has placed a ban on flour and lumber at New York. It recently had been estimated that there were about 15,000 loaded freight cars in tidewater railroad yards at New York, waiting to be moved, the congestion being due to inadequate steamship and lighterage facilities.

Exports from the port of New York for the week ending Nov. 20, were $65,413,454, in excess of $2,000,000 a day, as compared with $19,885,938 for the corresponding week in 1914 and with $13,219,049 for the same week in 1913.

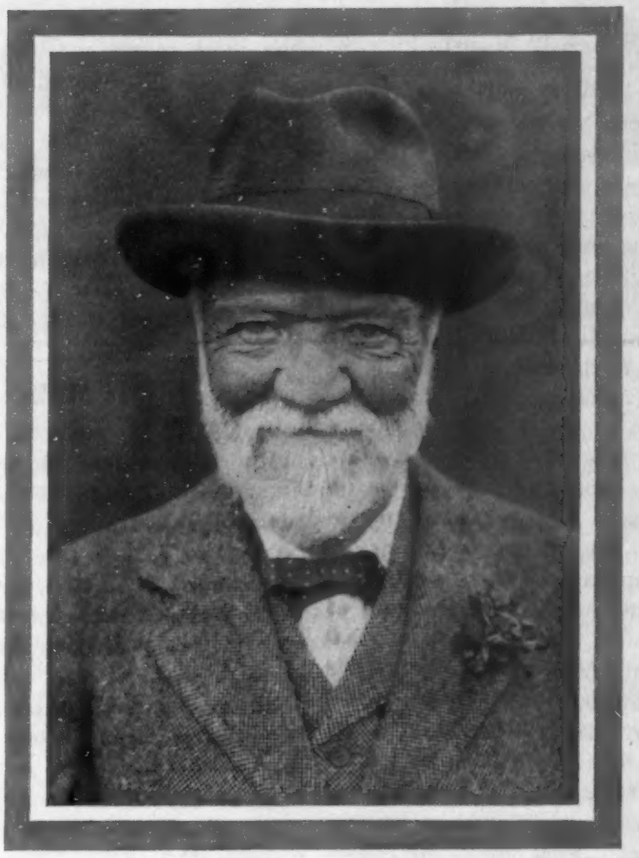
Another Ford Plant

Newark, N. J., Dec. 1.—Henry Ford, automobile manufacturer, has purchased a tract of 80 acres near here upon which to establish a big eastern plant. The land is along the meadows between Newark and Jersey City.



DOELGER & KIRSTEN ALLIGATOR SHEAR

Carnegie Smiles at Eighty



ANDREW CARNEGIE

ANDREW CARNEGIE has paid to the public, from which his great wealth was derived, his conception of the debt of responsibility of very rich men. And he feels very well over it—so well that he hopes his years may be lengthened and crowned with peace and the good-will of his fellow-men. At 66 he retired, possessed of one of the world's greatest fortunes. At 80, he has reached a self-elected position far down the list of America's wealthy men and now is numbered in the "moderate" class as millionaires go. Henry S. Pritchett, president of the Carnegie Foundation, in an address at the Carnegie Day exercises at Pittsburgh, Nov. 24, announced to the world the accomplishment of Mr. Carnegie's purpose to square practice with his preaching of the doctrine of consecration of wealth. The great bulk of the steel master's accumulation, almost $400,000,000, has been placed in various forms for the benefit of the public and for the general betterment of mankind. These enterprises have included foundations, libraries, colleges, universities, pensions, research funds, internation peace propaganda and other plans. It is not to be supposed, however, that the canny steel master has not made provision for a "rainy day". He, himself, says he hopes to live to an age of 100 years. If quiet and careful living, unburdened by business cares and now freed of the responsibility of managing or distributing a colossal fortune, can bring this about, his wish may be gratified. A New York newspaper claims information from an intimate source that the sum retained for the needs of old age is about $20,000,000.

Mr. Carnegie spent his eightieth birthday, Nov. 25, Thanksgiving Day, in an unusually quiet manner at his residence at Fifth avenue and Ninetieth street, New York City. He walked in his garden, ate a good dinner and received a few friends. He is enjoying especially good health after his attack of grippe at Bar Harbor last summer, but his physicians continue to prescribe for him a state of perfect quiet and tranquility. For that reason, he denied himself on his birthday the annual interview with the reporters, from which he always has gained so much pleasure in imparting to the general public his ripe wisdom and quaint observations on the ways of the world. This was the message he gave his secretary for the reporters this year: "Say to the reporters who usually call on my birthday that all goes well with me. Dr. Garmany marvels at the splendid return to health which a summer on the Maine coast has wrought.

"The world grows better and we are soon to see blessed peace restored and a world court established, when, in the words of Burns:

"Man to man the world o'er
Shall brothers be for a' that."

Increases Orders

By Several Hundred Thousand Tons—Pennsy May Buy Cars

New York, Dec. 1. (By wire.)—Despite restraining pressure and high prices, the flow of new business in finished materials continues to exceed greatly the capacity in practically all lines. The Steel Corporation, in November, notwithstanding efforts to keep down bookings, added perhaps 300,000 to 400,000 tons to unfilled orders. On second quarter business, 1.80c, Pittsburgh, is quoted by one large producer.

A large export company last week refused an aggregate of 60,000 tons of export orders for a neutral country at offers of 2.10c, Pittsburgh.

The Southern Pacific now places 15,000 to 20,000 tons of rails, but division not announced. The Katy gives the Illinois Steel Co. 15,000 and the Chicago & Eastern Illinois 10,000 tons. Miscellaneous orders amount to 5,000 to 10,000 tons.

The Pennsylvania, according to present indications, will be forced to place cars this week at the mills' prices, as it needs equipment keenly.

The royal Norwegian department for foreign affairs has announced the appointment of Johan Molback-Thellefsen as a special representative of the defense department of the Norwegian government. Mr. Molback-Thellefsen intends to visit the United States shortly for the purpose of conducting an investigation and making purchases.

Increases Inquiry

New York, Dec. 1. (By wire.)—The International Pump Co. today issued additional inquiries for about 14,000 tons of pig iron, principally foundry grades for first half to various plants. This increases the total inquiries of this buyer to about 16,000 tons. A New Jersey mining machinery builder increases its purchases to 4,500 tons.

THE OPEN HEARTH

Adequate Protection Needed

A BULLETIN relating to dye stuffs sent out by one of the government bureaus at Washington states that there is increased confidence among both manufacturers and sellers of dye stuffs that at an early date legislation may be passed by congress which will give the necessary security to American manufacturers of synthetic colors that their industry will not be threatened by organized underselling at the close of the present war. The bulletin says that this confidence is reflected in the increased amount of capital being invested in dye stuff plants.

An encouraging feature of this bulletin is that it indicates that some of the officials at Washington are awaking to the importance of giving protection to American manufacturers who have begun the manufacture of dye stuffs since the European war started or have increased their capacity. The production of American coal tar dye stuffs is now at the rate of about 9,000 tons per annum, compared with 3,000 tons at the beginning of the war, and it is expected that by the end of 1916 the output will reach 16,000 tons. It is not, however, merely organized underselling at the close of the war which is to be feared. That probably would come under the definition of dumping or selling at a lower price than those prevailing in the foreign countries. That would, of course, be serious competition and the manufacturers should be protected against it. They should also be protected against the regular and ordinary competition from foreign countries. It is doubtful whether for some years these dye stuffs can be made in the United States as cheaply as they can in Germany and other foreign countries which have made them for many years and reasonable protection should be accorded American manufacturers, so that they will be able to continue permanently in the business. If, however, after a thorough attempt, it is demonstrated that Americans cannot make these dye stuffs at a fair price, their energies should be turned in other directions.

In the present congestion in railroad shipments between the central west and the eastern seaboard, with the railroads overwhelmed with freight for shipment abroad, another impressive lesson of the need for upbuilding the merchant marine is furnished and it would seem that the appeals of far-sighted individuals who have so long advocated measures for assisting in creating a merchant marine would be heard. But the opponents of anything that savors of government aid have so long resisted the adoption of an aggressive policy that no one dares predict now that they will change their attitude. Mr. Schwab's vigorous address at Pittsburgh last week is one of the most recent and valuable additions to the discussion on the subject. He spoke along broad lines, expressing no anxiety as to whether the establishing of a merchant marine would result in large profits to some people. "It matters not," said Mr. Schwab, "who makes the money, if the general good of the people is served." That is sound doctrine and congress will do well to heed it. This merchant marine should receive early, prompt and broad consideration at the hands of the legislators at Washington.

It Means Business

BUSINESS interests generally have been much impressed by the high standing and recognized ability in the commercial world of the men who organized the American Industrial Corporation as well as by its scope and plans of operation. This corporation was incorporated at Albany last week with a capitalization of $50,000,000 and with powers for investing $500,000,000 in the extension of the foreign trade of this country. Strong financial, industrial, engineering and manufacturing resources are represented by the men who are to take an active part in this enterprise and the plan as outlined stands out as the most comprehensive effort yet launched for the acquirement of export markets by business minds of the United States.

The breadth of the charter is significant in view of the general appreciation in this country of the methods that have been used by Germany and England, particularly the former, in building up its foreign trade, especially in South America. The German branch banks and their commercial organization on the ground which has permitted them to handle a proposition from its inception through its promoting, engineering and finally its construction stages have enjoyed an important advantage which promises no longer to stand unchallenged. The new corporation may acquire real estate, issue securities, acquire leases and franchises, engage in mining, manufacturing, agriculture, lumbering, smelting, general merchandising, build power plants, water and gas and other public works and in fact carry on practically all pursuits except banking in the domain of ordinary business. The banking side of the proposition is to be handled by the branch banks already established in many foreign countries by the National City Bank of New York.

This giant new corporation is of extraordinary importance in that it typifies the awakening and the application of the best of American business genius to the art of foreign trading, along the broadest possible lines. Too often American business men have been unwilling to expend the painstaking study and

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effort required to capture export trade. They now have before them a notable example of an intense, co-operative enterprise shared in by some of the greatest business men of the country, which aims to go into the very rudiments of foreign commerce and to develop it from the ground up. The result should be to impart a solidarity to the nation's renewed interest along export lines and to converge many plans in that direction which have been individual and scattered.

Industrial Preparedness

"THE machine shops of the United States may some day become deciding factors in the maintenance of international peace," is the sentiment with which Franklin T. Miller, an engineer of long experience, concludes an article in *The Outlook*, in which he advocates that the government enter into an elaborate arrangement with industries of the country, so that in the event of war Uncle Sam could quickly avail himself of the services of trained machinists and others in the manufacture of munitions. The proposed system of industrial mobilization may be summarized as follows:

(1) The enumeration and classification of all manufacturing plants in the country, the ascertaining of the number and kinds of machines they use, the number of workmen, skilled and unskilled, they employ. The purpose of this is to enable the government to locate all private plants capable of manufacturing war material—not only complete war material, but parts to be assembled at the United States arsenals.

(2) The compilation by the various bureaus of the army and navy of all the designs and specifications needed in placing orders with manufacturers, exception being made of the designs which it is intended to keep secret.

(3) The training of manufacturers and their employes in the production of war material by placing with them in time of peace small orders for the munitions and supplies required annually by the army and navy.

Mr. Miller would have an organization of all manufacturing and industrial agencies that could be utilized in case of war and he believes that the plan could be effected through a bureau of munitions at Washington, composed of officers of the army and navy, representing different departments and bureaus. Having collected the necessary information as to what different plants could do, the government would certify certain plants as government plants and yearly payment for work actually done in times of peace would serve as a retainer, while a prearranged system of payment to stockholders of a specified percentage on their capital stock, or of a prearranged leasing price in the event of taking over plants, would enable the government to obtain munitions without controversy as to prices in time of war. Mr. Miller points out that, as England has learned to her cost, industrial discipline in the shop is as necessary as military discipline in the trenches and the successful operation of the plan would involve the co-operation with the government of labor as well as capital. He suggests that those engaged in the industries might pass governmental examinations and receive commissions. For example, a good machinist would receive a commission similar to that of a corporal, a foreman would be commissioned as a sergeant and a manager as a captain.

It is easy to see that the plan could be worked out without solving many difficult problems, but that fact is not a reason for rejecting it. We believe it is worthy of the most careful consideration.

Why Not?

WALSH, chairman of the late commission on industrial relations, has taken it upon himself to dictate, or attempt to dictate, that which he and his cohorts would like to see enacted with regard to laws and amendments at the next convening of congress. The unmitigated nerve of the man is shadowed by the fact that the situation is wholly ludicrous. The fact that Walsh has already made his debut in the publication of that wordy document referred to in these columns last week will serve to clothe this new outbreak in its proper garb.

"Why not?" he asks, in answer to the question of foisting upon the citizens of the United States such laws as are agreeable to organized labor, and labor alone. Why not? All semblance of fair dealing is lacking in the question. It might be equally propitious to inquire, Why should we, a democratic nation, whose very constitution precludes any such usurpation of individual right, be called upon to witness labor in any guise, mount the platform of free speech and declare its intention to dictate? Why should we, a nation of republicans, bow down, in direct contradiction to every principle of republicanism, to unreasonable demands of labor, or be subject to any of its unfair decrees?

The point is that we WON'T! Perhaps it is forgotten by those of the type of Walsh that you can't fool all the people all the time, and a practical joke perpetrated upon a second occasion usually results in a pitiful spectacle—for the perpetrator.

It isn't likely that Walsh will revise the constitution to his own liking. It isn't likely that congress will be hoodwinked. It isn't likely that Walsh and his legion will make much impression.

Prices Present and Past

Quotation on leading products December 1, average for November, 1915, average for September, 1915, and average for December, 1914. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Dec. 1, 1915.	Aver. for Nov., 1915.	Average for Sept., 1915.	Aver. for Dec., 1914.
Bessemer pig iron, Pittsburgh..	$18.95	$17.45	$16.80	$14.70
Basic pig iron, Pittsburgh.....	16.95	16.70	15.65	13.45
No. 2 Fdy. pig iron, Pittsburgh	17.95	16.45	15.45	13.70
Northern No. 2 Fdy., Chgo....	18.00	17.12	13.80	13.00
Lake Superior Charcoal, Chgo..	18.75	17.50	15.95	15.75
Mall., Bess., Chgo.....	18.00	17.42	14.20	13.00
Southern No. 2, Birmingham...	14.00	13.50	11.50	9.50
Southern Ohio No. 2, Ironton..	16.50	16.25	14.50	12.63
Basic, eastern Pa.....	17.75	17.75	15.25	13.50
No. 2X Virginia furnace.....	15.50	15.50	12.75	12.50
No. 2X foundry, Philadelphia...	18.00	17.75	15.00	14.25
Ferro mang., Balti., (prompt)..	100.00	100.00	110.00	68.00
Bessemer billets, Pbgh.....	28.00	27.75	24.60	19.00
Bess. sheet bars, Pbgh.....	30.00	28.25	24.60	19.50
Op.-h'th sh. bars, Pbgh.....	30.00	28.50	25.80	19.50
Open-hearth billets, Pbgh.....	28.00	28.00	25.60	19.00
Steel bars, Chgo.....	1.89	1.79	1.54	1.20
Steel bars, Pittsburgh.....	1.80	1.625	1.34	1.10
Iron bars, Philadelphia.....	1.859	1.759	1.459	1.15
Iron bars, Cleveland, local del'y.	1.60	1.50	1.35	1.15

	Prices Dec. 1, 1915.	Aver. for Nov., 1915.	Average for Sept., 1915.	Aver. for Dec., 1914.
Iron bars, Chgo. mill.....	$1.60	$1.48	$1.31	$0.95
Beams, Chgo.	1.89	1.79	1.54	1.20
Beams, Pittsburgh	1.75	1.625	1.34	1.10
Beams, Philadelphia	1.859	1.759	1.509	1.20
Tank plates, Pittsburgh.....	1.75	1.625	1.32	1.07
Tank plates, Chicago.....	1.89	1.79	1.49	1.20
Tank plates, Philadelphia.....	2.009	1.759	1.509	1.20
Sheets, blk., No. 28, Pbgh.....	2.50	2.22	1.92	1.85
Sheets, blue an., No. 10, Pbgh.	2.25	1.85	1.52	1.35
Sh., galv., No. 28, Pbgh.....	4.75	3.906	3.67	2.85
Wire nails, Pittsburgh.....	2.00	1.87	1.69	1.55
Connellsville fur. coke, contr...	2.35	2.35	1.84	1.69
Connellsville fdy. coke, contr...	3.00	2.96	2.37	2.25
Heavy melting steel, Pbgh.....	17.00	15.31	14.25	10.30
Heavy melting steel, east'n Pa.	15.50	14.50	14.50	9.50
Heavy melting steel, Chgo.....	15.00	13.13	12.00	8.25
No. 1 wrought eastern Pa.....	17.50	17.00	16.00	11.50
No. 1 wrought, Chgo.....	14.25	12.75	10.75	7.50
Rerolling rails, Chgo.....	15.50	14.31	13.15	9.50
Car wheels, Chgo.....	14.75	12.73	11.75	10.00

(For Additional Prices See Page 1106.)

Pig Iron Prices Still Advancing

Sales of Small Tonnages Made at Buffalo at $20—Bessemer Held at $20 by Some Makers—Toledo Prices Higher

New York, Nov. 30.—While the iron market is not active in this territory, there is a fair run of miscellaneous orders and much strength continues to be reflected in prices. Buyers seem to have reached the stage where they readily will pay the advanced prices quoted whenever they are actually in need of iron. Some foundries in New Jersey have been having trouble to get in shipments of iron and coke because of the severe freight congestion in that territory. Talk of $20 iron continues in the Buffalo district and one maker actually has sold No. 2X quality in small lots at this figure, some for New England delivery. This maker has a large stock of iron on hand upon which it now is quoting $20, furnace, for both No. 2X and malleable and is holding firmly to that price. Other Buffalo makers are naming $17.50 to $18 for No. 2X. Eastern Pennsylvania iron is higher at tidewater by the withdrawal of the lower prices recently asked for this year against first quarter. Tidewater quotations now are at $18 to $18.25, for No. 2X. A New Jersey mining machinery builder bought 1,000 tons of eastern Pennsylvania No. 2 plain for forward delivery at $16.75, furnace, and about 1,000 tons of a similar grade from Virginia. This buyer still is in the market. The International Steam Pump Co. is inquiring for about 2,000 tons of mixed grades, of which 1,000 tons is for Elmwood Place, O., and 800 tons for East Cambridge, Mass. A Paterson, N. J., buyer wants 700 tons of No. 2X and 3 for second and third quarter. About 1,000 tons of bessemer ferrosilicon and high-silicon iron for eastern and western delivery, are in the market. Virginia makers now are beginning to consider last half business and the Virginia Iron, Coal & Coke Co. is quoting $16.75 to $17, furnace, for No. 2X for that period. Freight congestion at tidewater points and embargoes being declared by the railroads upon export business are having a restraining effect upon foreign trade in iron. High ocean freights also are curbing transactions. The Imperial Steel Works of Japan is in the market for 2,000 tons of low phosphorus for December and 4,000 tons for first quarter.

Coke Shipments Delayed

Philadelphia, Nov. 29.—Eastern Pennsylvania makers of pig iron are beginning to discuss the possibilities of shortages of early metal owing to shrinking stocks and the maintenance of a heavy demand. Another factor which appeared this week concerns coke shipments and the increasing freight congestion on eastern railroads. At least one furnace was obliged to bank for several days because of the non-arrival of a consignment of coke which had become tied up en route. Because of the reduced supply of iron in sight, the spread between this year and first quarter prices is disappearing. Makers who had been loading No. 2X for this year at $17, furnace, now are quoting $17.50, minimum, for any shipment to April 1. There still appears to be a limited amount of iron available below this figure, however. Sales of first quarter No. 2X at $18.25, Philadelphia, or practically $17.50, furnace, are noted. A lot of 6,000 tons of No. 2 plain for this year and first quarter went at $17, furnace. One eastern Pennsylvania maker is asking $18, furnace, for first quarter or half on No. 2X. There is little pressure to sell anywhere. Pipe iron is higher at $17.25 to $17.75, delivered this district. A Lehigh valley maker sold 2,000 tons of this grade for several months' delivery at $17, furnace, or about $17.60, delivered. Several thousand tons of puddling forge recently were sold at $17, delivered, but this could not be duplicated. The seller now asks

(*For complete prices see page* 1106.)

$17.25, furnace. The market is probably $17.50 to $17.75, delivered. The Standard Cast Iron Pipe & Foundry Co., Bristol, Pa., wants 5,000 tons of No. 3 and forge, second quarter. Virginia prices continue to manifest much strength, but are unchanged with $16, furnace, now indicated as the minimum for forward No. 2X. The Lenoir City, Tenn., car works asks 3,000 tons of mixed grade first quarter and 3,000 tons second quarter. Southern makers quoted $14.50 and $14 for No. 1 and No. 2 respectively. In basic, a New Jersey steelmaker bought 3,000 to 5,000 tons for prompt shipment at $17.75, delivered. A Cumberland, Md., consumer asking 5,000 tons for second half, received only one or two bids which came from distant points and were around $20, delivered, or at an advance of at least $1 over first half. The business remains open. Other special transactions in basic are under way. All makers of low phosphorus are so filled up with orders that they are able to sell but little first half iron. Sales consequently are light, though the inquiry is good, including 1,000 tons for a western buyer and 6,000 tons for export. Prices continue around $30, furnace. Another Thomas Iron Co. furnace will resume in December.

Prices Advance

Pittsburgh, Nov. 30.—The price of bessemer pig iron this week has advanced from a minimum of $17 to $18, valley, and some dealers are quoting $20 for first quarter delivery. One lot of 3,500 tons of bessemer iron has been sold by a broker for delivery to April 1 at $18, valley; the Westinghouse Machine Co. has taken 500 tons for similar shipment at $18.50, valley, and several other sales are reported at that figure. Foundry and malleable grades are selling at $17, valley. Basic iron is listed at $16, valley, but indications are that $17, valley, could not be shaded.

Specifications for all grades are coming out in heavy volume and it appears likely that an acute shortage of pig iron will be experienced the next few months. Stove manufacturers are supplementing purchases made some time ago; steel manufacturers quietly are negotiating for additional iron and other consumers are buying all available tonnages in this district. The scarcity of ore already is felt in some quarters; relief cannot be promised until the opening of the lake navigation season next spring.

Prices Going Up

Buffalo, Nov. 30.—For the first time since 1907, pig iron has been sold by a Buffalo producer for $20 at the furnace. The order booked was for malleable iron. The tonnage involved was not large, but the iron was needed for immediate consumption and the price paid reflects the tendency of the market.

Sales for the week for all grades amounted to about 18,000 tons for prompt, first quarter and first half deliveries. While for a brief period some iron may be obtainable, if deliveries are satisfactory to the producers, at the schedules quoted a week ago, the majority of the furnace interests here have advanced their minimum to $18 for any grades. One interest is quoting $18.50 to $19 on anything above 3 per cent silicon. Basic is firmly established at $18 to $19. All quotations on charcoal irons were withdrawn yesterday by the principal Lake Superior district producing interest owing to the scarcity of available tonnage and the increase in the demand. Today this order was followed by a sharp advance of $2 per ton for immediate, first quarter and first half needs. Premium prices are being asked in addition to this on special grades of charcoal iron.

Shipments continue to be unusually heavy. One interest is reported to be at least 200 cars behind in its deliveries. The congested condition of the railroads adds to the seriousness of the situation. Foundries that formerly figured on a week for deliveries of cars ordered out are finding that 10 days and longer are now required and are accordingly swelling the pressing demands on the furnaces for iron.

Iron booked for melters for deliveries during January, February and March is being called for now and consumers in many cases are insisting upon immediate deliveries. Other foundries are advising the furnaces that they are ready to take all of their first quarter's iron at any time the producers are ready to make shipments. The furnaces, however, are declining to ship in this manner and are holding the consumers to delivery periods specified in their contracts.

A number of interests have come into the market for their needs extending over third quarter and last half of 1916, but the producing interests of this section are turning down all such efforts on the part of consumers, even in the case of long established customers.

The bulk of the sales made now are for scattered tonnages. There seems to be little available high silicon iron.

Melt Increasing

Cleveland, Nov. 30.—The most significant feature of the pig iron market in that district is the heavy increase in melt of foundries, which are reporting that they will need much more iron than expected. In one case in which a foundry wished to buy 2,000 tons additional for first half, a furnace consented to sell half of that amount at $17, furnace. The Cleveland furnaces have so little iron to sell that they are practically out of the market up to July 1. Agencies having furnaces outside of the Cleveland district report a very strong situation. At Toledo, the price has been advanced to $17.50 for No. 2 foundry for delivery up to July 1, which is 75 cents higher than quoted last week. A Canton consumer of basic is reported to be in the market for at least 5,000 tons. The Cleveland price on basic is $17, furnace, but no sales are reported at any figure, the last sale of basic having been made about a month ago.

Iron Advance Continues

Chicago, Nov. 30. — All makers of northern foundry and malleable pig iron have advanced quotations to $18, Chicago furnace, and this price is being maintained firmly.

Some anxiety on the part of melters as to their supply of iron for last half is becoming evident in numerous inquiries for that option. Some sellers are not yet ready to make quotations that far into the future, but at least one maker is planning to quote $18, Chicago furnace, for third quarter, with a probable premium for final quarter.

An important producer of Lake Superior charcoal iron withdrew from the market at the beginning of this week and immediately announced a revised schedule of quotations, calling for $19 to $20 at the furnace and $20.75 to $21.75, delivered, Chicago.

Large accumulations of charcoal iron which have had a depressing effect on the market for some time are disappearing and their effect is much lessened.

Southern iron is being held by most makers at $14, Birmingham, but there are indications that some iron at $13.50, Birmingham, is still available. This quotation seems to be disappearing rapidly.

Prices Slowly Advancing

Cincinnati, Nov. 30.—Pig iron prices are slowly advancing. One large southern Ohio producer is now asking $17, Ironton basis, for No. 2 foundry, for first half delivery, but this grade can still be obtained at $16.50. It is very evident, though, that $17 will be the minimum figure in the near future. Southern iron is dragging at $13.50, Birmingham basis,

(*For complete prices see page* 1106.)

for No. 2 foundry, but the tonnage to be obtained at this price is small, and is for prompt delivery only. The majority of furnaces are asking from $14 to $14.50 for the first half of next year. Silvery iron is strong at $24, furnace, for 8 per cent silicon, and bessemer ferro-silicon is being held at from $26 to $27, furnace, for from 10 to 11 per cent. Sales are light, and are coming more from solicitation by salesmen than from general inquiries. The only inquiry of importance pending is from a local melter for 1,000 tons of foundry iron.

Prices are Strong

St. Louis, Nov. 30.—Inquiry for pig iron has dropped off considerably since last week, but prices of all grades are strong. Local sales agents attribute the lack of inquiry to the fact that dealers are fairly well supplied, and the near approach of the stock-taking season. One inquiry in the market is for 75 tons of ferro-manganese, the price of which recorded here is $100 f. o. b. New Orleans.

Sales last week included 350 tons of southern No. 2; 200 tons of southern No. 2, and 50 tons of 10 per cent and 11 per cent high silicon. High silicon is held at $23 a ton f. o. b. Ohio furnace.

The prevailing price on southern No. 2 is $14.50, Birmingham basis. Northern iron is priced at $18, Chicago, and $16.50 to $17, Ironton.

Shipments Delayed

Birmingham, Ala., Nov. 30.—One large interest continues to sell No. 2 foundry at $13.50 for the first half of 1916, while another large maker is booking good business at $14. Very little spot iron inquiry is abroad.

While the Woodward Iron Co. is soliciting no business, it is understood to be in the market again and is closing what inquiries it receives on the basis of $14 for No. 2 foundry, second half delivery. All furnace interests stoutly deny reports from northern markets that there are quantities of iron in this district to be had at $13. Shortage of cars is delaying movement of iron.

Pipe Prices Advanced

Pittsburgh, Dec. 1. (By wire.)—Effective today, the National Tube Co. advanced prices on steel boiler tubes $2 a ton in less than carload lots, by reducing discounts 1 point. Three and one-half to 4½-inch now are quoted at 68 per cent off as against 69 per cent under the last previous card issued under date of Oct. 29. Boiler tubes have advanced $12 per ton since April 30.

Plate Prices Still Rise

But Demand Continues Strong—Pennsylvania Steel Co. in Market for Large Tonnage

Philadelphia, Nov. 29.—Another strong advance of $3 to $5 a ton has been made by eastern Pennsylvania plate makers, but it has failed to stem the tide of new demand, which is very heavy, leading some mills to strictly hold quotations to steady customers. On current business, for delivery as the mill is able, 2.00c, Pittsburgh, or 2.159c, Philadelphia, now is quoted while one maker who is almost overwhelmed with orders, is naming 2.25c, Pittsburgh, or 2.409c, Philadelphia, on first quarter contracts. The 1.70c, Pittsburgh, price named by western mills appears practically nominal. One mill east of Pittsburgh refused 1.70c, Pittsburgh, on 1,600 tons for shipment west of Pittsburgh. One of these makers mentions 1.85c, Pittsburgh, as the price at which it would actually sell. The Pennsylvania Steel Co. has inquired for 25,000 tons of plates in addition to a large tonnage of other forms for shipment over several months to cover. New structural requirements and some eastern mills have been forced to decline to even quote on this order. There has been some buying by one plate maker of another. The Harlan & Hollingsworth Corporation has been awarded a tank vessel for the Savannah line, requiring about 6,000 tons of steel. Many boats still are on the pending list.

Car Shortage May Affect Production

Pittsburgh, Nov. 30.—Manufacturers of structural shapes and plates in the central west are confronting a serious shortage of railroad cars and, as a consequence, shipments are more deferred. In an effort to relieve the situation, some railroad carriers have placed embargoes against tonnages for foreign shipment, hoping to relieve congestion at the eastern seaboard. Structural plates are being held at 1.70c for delivery at the convenience of mills, but as high as 2c, and even 2.10c, is being obtained by mills in a position to offer nearby shipment. The decision of the Pennsylvania railroad not to buy cars at the present time, because of high prices, apparently has not affected other railroads, since inquiries for car material have not fallen off.

High Plate Prices

Cleveland, Nov. 30.—Cleveland mills are quoting 2.25c, Pittsburgh, as the minimum for prompt delivery and sales of small quantities have been made at as high as 3c. Eastern Pennsylvania mills are quoting 2.05c as a minimum and deliveries are delayed from three to four months.

In Demand at Chicago

Chicago, Nov. 30.—The situation as to steel plates is similar to that in bars and shapes. If any difference exists, the demand for plates may be stronger and there is a better possibility of obtaining prompt supplies, as a number of small mills have reserved capacity and are now reaping the reward of foresight. Sales have been made recently on a basis of 2.34c, delivered, Chicago, although the leading interests quote 1.89c nominally.

(*For complete prices see page* 1106.)

Beg for Billets

And Have Difficulty in Getting Them Even at High Prices

Philadelphia, Nov. 29.—Western buyers of forging billets have been beseeching eastern makers to supply their needs at practically the mills' own price, but the latter have found it impossible to meet these demands because their capacity is booked full for months ahead. Some of these buyers have declared they had visited makers in all parts of the country, but had met with the same reply in all cases. That some of these consumers are being crippled in their operations by the present famine in semi-finished steel goes without saying. Eastern Pennsylvania makers have sold forging billets at $55, mill, and their ideas of rerolling open hearth billets are $36, mill. Foreign inquiries for billets continue numerous.

Semi-Finished Nominal

Pittsburgh, Nov. 30.—Prices of semi-finished material at Pittsburgh and Youngstown are practically nominal, because of the absence of selling. Most consumers have covered requirements as fully as possible until April 1 and scarcely any new buying is reported. According to some people in close touch with the situation, billets and sheet bars are not obtainable at less than $30, mill. Forging billets are commanding as high as $50, in isolated instances. Wire rods are not being offered in the open market; whether $39, Pittsburgh, could be shaded seriously is doubted. In fact, some manufacturers

regard the market quotable at $40, Pittsburgh, and above.

Forging Billets Very High

Cleveland, Nov. 30.—A Cleveland consumer has been quoted $55, eastern mill, or $58.34, delivered Cleveland, on forging billets for first quarter of next year. No buying has been done at this figure, and very little at any price, as the supply is extremely limited.

Sheet Mills Are Rushed

Manufacturers Are Handicapped by Shortage of Steel and by Other Troubles—Prices Higher

Pittsburgh, Nov. 30.—Manufacturers of steel sheets in western Pennsylvania, West Virginia and Ohio are pushing mills to the limit in an effort to satisfy demands of consumers. Manufacturers are handicapped by the shortage of steel, the scarcity of acids and the high price of spelter for galvanizing, and some plants need additional mill men. Galvanized sheets, offered only by a few makers, have jumped $5 a ton to 4.75c for No. 28 gage, with some sellers asking 5.25c; black sheets are commanding 2.50c and above for No. 28 gage and blue annealed products are selling at 2.25c—$5 a ton above the price prevailing a week ago. Sheet mills, operating at about 80 per cent of capacity, are unable to cope with the situation, and deliveries are more and more deferred each week.

Prices Uncertain

Chicago, Nov. 30.—Quotations on steel sheets are somewhat uncertain as to the maximum, but firm as to the minimum. Black sheets, No. 28 gage, are obtainable at 2.69c, Chicago, and quotations range from that level to 2.94c, Chicago. No. 28 gage galvanized sheets may be obtained at 5.19c, Chicago, and from that figure to 5.44c, Chicago. Blue annealed sheets, No. 10 gage, are quotable at 2.49c, Chicago, and upward.

A maker of sheets in that territory figures that with black sheets at 2.75c, Pittsburgh, and spelter at 18c per pound, galvanized sheets should sell at 5.35c, Pittsburgh. Present quotations indicate that this differential is being followed in most cases. It is believed that galvanized sheets above 3.50c, Pittsburgh, are higher than most consumers can use economically and nearly all sales at present prices are to consumers who cannot substitute any other product.

Cincinnati Sales Active

Cincinnati, Nov. 30.—Sales of sheets are increasing despite the fact that mills will sell only for prompt shipment. Demand for sheet bars from the east is so great that several makers in this district have found it more profitable to sell them direct rather than to turn them into sheets. Sheet prices are strong, and are slowly advancing. Black No. 28 gage are quoted at from 2.40c to 2.50c, Pittsburgh basis, and galvanized No. 28 gage at from 4.40c to 4.50c, Pittsburgh basis. No. 10 blue annealed are quoted at from 2.15c to 2.25c, Pittsburgh basis.

Another $4 Rise in East

Philadelphia, Nov. 29.—Another advance of $4 a ton has been put into effect by eastern Pennsylvania makers of blue annealed sheets and 2.40c, Pittsburgh, or 2.559c, Philadelphia, now is being quoted for first quarter. The demand is strong. Recent orders for passenger equipment placed by the railroads are calling for a considerable tonnage and there is much building up of stocks by jobbers and manufacturers who had allowed them to fall low. Warehouse prices in blue annealed sheets are rising uniformly with mill schedules.

Foreigners Want Tin Plate

Pittsburgh, Nov. 30.—Heavy demand for tin plate for shipment to England, Asia and South America, coupled with a normal domestic demand, characterizes the tin plate market in the central west. Many domestic consumers covered requirements for several months just before books for the 1916 season were opened a fortnight ago, but foreign interests are playing a very active part in the market today. The $3.60 base price is decidedly firm; that higher prices may be made when buying for the second quarter of next year begins, seems likely.

Nuts, Bolts and Rivets

Pittsburgh, Nov. 30.—Advanced prices of nuts, bolts and rivets, announced a week ago, are being maintained firmly by manufacturers in this district. Plants are being driven at maximum capacity, filling orders for domestic and foreign trade. Further price advances are expected.

(*For complete prices see page* 1106.)

Ferro is Firm

Promises of English Shippers Not Fully Realized

New York, Nov. 30.—Promises by English makers of a considerable increase in the shipments of ferro-manganese to this country during November, having failed to be realized fully, the market in this alloy is displaying a tightened effect and prices are very steady. Concessions of $1 a ton from the official figure of $100, seaboard, either for early shipment or on contracts, seem to have disappeared almost completely. A number of transactions are being made steadily on that basis, but the tonnage makes only a moderate total. A sale of 500 tons of English for January-February shipment at $100, seaboard, was made this week.

It is now advised by English producers that the steamship MALVERN RANGE, which was to have sailed under November licenses with several thousand tons, has been held back and will sail next month with an increased tonnage to include that covered by December licenses now being issued. The present indications are that this vessel will carry from 5,000 to 6,000 tons.

Domestic makers of ferro-manganese are holding firmly to $100, seaboard. One steel company which has been an important seller lately, now is out of the market.

Considerable buying of domestic spiegeleisen has been done within a few days, and sales of the week are estimated at 4,000 to 5,000 tons, with 2,000 to 3,000 tons pending. All of this is for home consumption. Prices are unchanged at $28 to $30 for 20 per cent. Some important inquiries for 50 to 75 per cent ferro-silicon have been received from dealers in England and other European countries, indicating that there is a shortage of this metal abroad.

Alloys Continue High

Pittsburgh, Nov. 30.—Eighty per cent ferro-manganese is being offered at $100, seaboard, but not much new tonnage has been sold recently. Most consumers have enough material under contract to meet requirements until April 1. Demand for 50 per cent and lower grades of ferro-silicon continues decidedly heavy and prices are firmly maintained. The scarcity of steel-making metals continues rather acute.

George Nash, a retired importer of high-grade steel, died on Nov. 29 at his home in New York City, aged 61 years.

Bars Are Hard to Obtain

Mills Overwhelmed and All Buying Except From Warehouse is Discouraged

Philadelphia, Nov. 29.—Eastern steel bar makers in the week declined buyers' offers of 3.75c, mill, per pound for tonnage lots of large rounds because they have none of this material to sell for many months. An Allentown, Pa., buyer is inquiring for 2,500 to 3,000 tons of 3¼-inch to 3⅞-inch rounds. The market for large rounds continues less active, but is very strong and makers with material for early delivery can command attractive premiums, as there still are many unsatisfied inquiries. Where they have not been able to avoid it, makers have accepted small ordinary steel bar orders at 1.70c, base Pittsburgh, or 1.859c, Philadelphia, but as a whole this is a nominal figure. One large maker informally is quoting 1.85c, Pittsburgh, as an active price. The Pennsylvania Steel Co. has out an inquiry for several thousand tons of different forms. Important makers of shafting now are quoting 52 off on carloads and 47 off on less than carloads or 2 points up.

Shell Steel Contracts

New York, Nov. 30.—A quieter market continues to prevail in steel bars, especially in the larger sizes of rounds suitable for munition manufacture. New general inquiries for material of this sort are fewer, for, while there are some unsatisfied requirements, the buyers appreciate that there is little to be gained by circulating these matters freely, since so many mills are unable to sell further. Some makers of shell steel have been endeavoring to book orders for all 1916 delivery without cancellation clauses, upon which they will grant price concessions, and have taken some tonnage for such shipment under 2.75c, mill.

Bars Difficult to Obtain

Chicago, Nov. 30.—Steel bars in that market are much like the proverbial hen's teeth. All sorts of expedients are being resorted to by consumers who are not covered and are unable to place tonnage with mills. Considerable substitution is being practiced, hard steel bars and bar iron being utilized in many places where soft steel bars ordinarily are used. Some small mills have been rolling steel bars from crop ends and disposing of them at a handsome premium over the nominal price for mill bars.

The leading interest is not in the market and the leading independent in this district is likewise refusing business. A nominal quotation of 1.89c, Chicago mill, is made by both these interests, but other producers, who have some capacity yet unsold, are taking some tonnage on a basis of 2.19c, Chicago.

Hard Steel Higher

Cleveland, Nov. 30.—The demand for bars continues as strong as ever and it is extremely difficult to get any kind of delivery except from warehouse. Hard steel bars have been advanced to 1.60c, mill, an advance of $1 per ton. Bar iron is firmer and is selling at 1.60c to 1.65c, mill. Spikes have been advanced to 2.10c. An inquiry for 100 tons of steel bars with an offer to pay any kind of a reasonable premium was not entertained by leading mills, which are declining to take any premiums and are discouraging the placing of all mill business.

Gain in Strength

Pittsburgh, Nov. 30.—That steel bars, plates and shapes will be advanced again in the near future seems inevitable. Despite efforts of manufacturers to hold prices at their present levels, consumers literally are driving quotations upward in their eagerness to obtain tonnages to meet immediate requirements. Steel bars for prompt delivery are quotable at 2c and above. Demand for large rounds for the manufacture of shrapnel has not diminished in volume. Iron bars are commanding 1.70c.

Premiums on Iron

Philadelphia, Nov. 29.—While some bar iron makers have not yet discarded 1.60c, Pittsburgh, or 1.759c, Philadelphia, this price now represents only a limited portion of the market, for most business is going at premiums of $1 to $4 a ton, especially where producers can supply early shipments.

Demand Active

New York, Nov. 30.—Prices on bar iron by eastern Pennsylvania mills, now have become quite firmly established upon the basis of 1.70c, Pittsburgh, or 1.869c, New York, which is $2 higher than the market of about a week ago. The demand is active.

Bar Iron to Advance

Chicago, Nov. 30.—Although all makers of bar iron are quoting 1.60c, Chicago mill, the market is strong and the opinion is held that by the end of this week 1.75c, Chicago mill, probably will be the minimum. One important producer is not taking further contracts for any delivery, as its books are well filled into next year, but another important producer is willing to assume some further tonnage at 1.60c, Chicago, for immediate delivery.

Increased cost of scrap and increasing demand for bar iron form the basis of the probable advance.

Hoops, Bands and Shafting

Pittsburgh, Nov. 30.—The Jones & Laughlin Steel Co. and the Crucible Steel Co. of America are increasing capacities of their respective shafting departments. The former company, when present plans are completed, will have increased its shafting production by about 33 per cent. The Crucible company is installing a machine to draw rounds up to 3 inches in diameter. Cold rolled steel shafting is held at 52 per cent off the list, although considerable tonnage is commanding $2 a ton above that price. Steel hoops have been advanced $3 a ton to 1.90c for shipment at the convenience of the mill. Bands are firm at 1.70c. Demand for both products is heavy and deliveries are deferred from three to five months.

(*For complete prices see page* 1106.)

Warehouse Prices

Are Again Advanced at Chicago and Other Leading Centers

Chicago, Nov. 30.—Advances were made today in finished steel products from store of about $2 per ton. The same advance goes into effect at St. Louis and St. Paul, the schedule being as follows:

	Chicago	St. Paul	St. Louis
Bars	2.20	2.30	2.25
Shapes and Plates	2.30	2.40	2.35
No. 10 blue annealed	2.60	2.70	2.65
No. 28 gage black	2.75	2.80	2.80

Warehouses are feeling more and more pressure for delivery of finished steel products without delay, as mill deliveries become more advanced. No runaway market has yet been experienced, but warehouses are feeling a constantly increasing pressure and enlarged sales.

Higher at Cleveland

Cleveland, Nov. 30.—Demand for all kinds of material from warehouses is very brisk with the exception of galvanized sheets, which are dull on account of the very high prices. Advances have been made of $3 on bars, $1 on shapes and plates and $5 on sheets, and quotations are now: Bars, 2.40c; shapes and plates, 2.40c; blue

annealed sheets, 2.65c; black sheets, 2.95c; galvanized sheets, 5.25c.

Advanced $3 at Buffalo

Buffalo, Nov. 30.—The sold-up condition of the mills over the next six months, with deliveries becoming more extended is tending to curtail inquiry and to force business to the jobbers, who in turn are being taxed to the limit. Warehouse prices have advanced $3 per ton on bars 2 inches and under, and on small shapes, bringing 2.35c, while rounds and squares, 2 inches and over, are now quoted at 2.70c, f. o. b. Buffalo, with 5c additional for store-door deliveries.

Rising at Philadelphia

Philadelphia, Nov. 29. — Warehouse prices in this district are rising steadily in conformity with the advances in mill schedules by eastern makers. From 2.30c to 2.40c, delivered, this district, now is being quoted on plates, shapes and steel bars and large steel rounds command a further premium. Sales of material cut to length at 2.40c, delivered, are noted. Bar iron from store is quoted at $2 under steel bars. Jobbers of blue annealed sheets have kept pace with the sharp advances in this material put into effect by eastern mills.

Moved Up in New York

New York, Nov. 30.—Premiums asked by the mills for nearby shipments continue to increase the cost of maintaining warehouse stocks and jobbers in this territory have made further advances in store prices. Plates now are quoted at 2.50c, in the metropolitan district; shapes at 2.40c; ordinary steel bars at 2.35c, and bar iron at 2.25c to 2.30c. Fancy premiums continue to be obtained on steel rounds of 2-inch and larger. Blue annealed sheets still are obtainable from warehouses at 2.50c to 2.55c, New York, for No. 10 gage.

Scrap Brokers Active

New York, Nov. 30.—The higher Pittsburgh market for steel scrap continues to affect prices in this district by attracting material to that territory and by forcing up bids of the brokers for eastern Pennsylvania delivery. For Pittsburgh shipment, $13.50, New York, continues to be offered, and $14 is reported. Brokers have offered up to $13, New York, against eastern Pennsylvania orders. It is understood here that Pittsburgh district mills have paid $17.25, delivered, for steel, which is equivalent to about $14.50, New York. Foundry scrap is very strong in this territory for which a high price is being paid.

Are Buying Lake Vessels

Ore Companies Take This Means of Protecting Themselves—Breitung & Co. Get the Yale

Cleveland, Nov. 30.—Heavy reservations of iron ore have been made for shipment next year and increased interest is shown in the market. In some cases, inquiries from consumers are due simply to inquisitiveness, but in other cases are due to a serious desire to know what the market will be. It seems pretty certain now that there will be an advance of at least 75 cents and probably $1 and that the opening of the market cannot long be delayed.

The regular season of navigation on the Great Lakes closed at midnight Tuesday night. Practically all of the ore shippers sent forward their final cargoes on Tuesday, though certain belated shipments will be made during the rest of the week. Figures as to shipments are not yet in, but the total movement will be between 45,000,000 and 46,000,000 tons. As soon as accounts are squared, the business of next year will be taken up and it is quite likely that ore sales will approximate the available movement of 1916 before the first of the new year. Shippers have covered their vessel requirements closely, though some of them would be glad to have additional tonnage. Vessel owners, however, are chary of contracting for all their capacity because they feel that the freight rate may advance. E. N. Breitung & Co. have purchased the steamer YALE, a steel ship of 5,700 tons capacity, from the Great Lakes Engineering Works. Some of the other shippers are negotiating for the purchase of vessel property and it is likely that, before the present week is concluded about eight bulk freighters will have changed hands.

The vicissitudes, sudden changes and unexpected happenings that the lake trade is subject to were well exemplified on Saturday night when the Canadian government laid an embargo on all grain in Canadian elevators. Loading ceased and for 36 hours vessels simply hung about the ports. At the conclusion of that time, however, arrangements were made to resume loading and demurrage will probably be paid to the delayed fleet.

Strip Steel Mills Sold Up

Pittsburgh, Nov. 30.—Manufacturers of cold rolled strip steel in the central west have withdrawn from the market, being unable to promise additional material for anything like nearby shipment. Heavy tonnages are being exported and domestic demand is abnormally heavy. Prevailing prices are nominal, but no formal changes in quotations have been made.

(*For complete prices see page* 1106.)

Cast Iron Pipe

Number of Public Lettings in New England Expected Soon

New York, Nov. 30.—A number of public lettings of cast iron pipe for spring delivery by New England towns and cities are in sight, and are expected to come out shortly. Private buying for next year is spreading, both in New England and other eastern territories. Providence, R. I., will take bids on Dec. 6 upon 600 tons of 4's to 12's, and Portland, Me., has awarded 650 tons to the Warren Foundry & Machine Co., at $30.25, delivered, for 4's and at $27.25 for 6's and 8's. The United States Cast Iron Pipe & Foundry Co. has taken 5,700 tons of 4's to 42's for the Consolidated Gas, Electric Light & Power Co., Baltimore. Batavia, N. Y., took bids Dec. 1 upon 400 tons of 12's and 16's. Some good lots for export continue in the market. Rio Janeiro is out for 3,400 tons of 16's and 24's and Port Columbia, South America, for 900 tons of 4's to 12's. Pipe prices continue to advance in this territory. For 6-inch class b, $27, New York, and for 4-inch, $30, New York, now are quoted.

Prices Will Advance

Chicago, Nov. 30.—An advance of $1 per ton on cast iron pipe in the Chicago market probably will be registered during the present week. Marked advance in pig iron points the way and present quotations of $27 to $29, delivered, Chicago, are somewhat below the usual differential. Bids were to be opened in Chicago Tuesday and Wednesday of this week on about 19,000 tons, and at Mishawaka, Ind., Monday, on about 500 tons. Figures will be taken Dec. 1 at Dayton, O., on 800 tons, and Dec. 10 at Sheboygan, Wis., on 680 tons.

A meeting of the Nut and Bolt Manufacturers' Association will be held in New York City, Dec. 8, with the annual dinner at the Waldorf-Astoria in the evening.

Heavy Buying of Scrap

Steel Corporation and Independents Take Very Large Tonnages—Prices Are Advancing

Pittsburgh, Nov. 30.—Approximately 300,000 tons of heavy melting steel have been sold the last ten days in western Pennsylvania, eastern and northern Ohio, in one of the most active buying movements experienced in many years. The United States Steel Corporation has taken approximately 100,000 tons and leading independent manufacturers have been covering needs. Railroad embargoes against scrap shipments to the Pittsburgh Steel Co., the Brier Hill Steel Co. and the plant of the Standard Steel Car Co. at Butler, Pa., have been declared.

Heavy melting steel is hovering around $17, delivered, with some dealers expecting to witness further sharp advances. Consumers are paying more for heavy melting steel than the prevailing price of basic pig iron, $16.95, delivered Pittsburgh, although that figure is regarded as nominal. Low phosphorus steel scrap is selling at $20.50, rerolling rails at $18; No. 1 wrought at $16; malleable at $15 and steel car wheels at $18.50 in this district. Most middlemen have sold short and are buying material at prevailing prices in the open market.

Feels Pittsburgh Influence

Philadelphia, Nov. 29.—A further effect of the sharp rise of heavy melting steel in the Pittsburgh market, attracting this material from many neutral eastern points, has been a 50 to 75-cent rise of this grade in the eastern Pennsylvania zone. One consumer this week took a moderate tonnage of first class heavy steel at $16, delivered, while brokers now are losing no time in covering their unprotected short sales, at $15.25 to $15.50, delivered. There has been no extended buying as yet, however, by large eastern consumers of steel. Great strength continues to be shown by No. 1 railroad wrought. A dealer sold this week on an equivalent of over $18, delivered, eastern Pennsylvania. Car wheels, No. 1 cast and rerolling rails are up. The government has announced no award on the 20,000 tons of Panama scrap upon which bids were taken a week ago.

Record Activity

Buffalo, Nov. 30.—Scrap dealers of the Buffalo district report that the market of the past week has been the most active in a number of years. Trading in heavy melting steel led the record business volume of the week, causing the price to advance $1 per ton. Small lots of what is known as select No. 1 heavy melting steel brought as high as $17. Old car wheels and cast scrap are following the upward trend and rigidity of the pig iron market. Old steel axles advanced $1 per ton and old iron axles 50c to $1 per ton, while low phosphorus steel scrap has gone up 50c. Notwithstanding the large production of machine shop turnings, this commodity also advanced in the upward move of the list.

Heavy Melting Gains

Cleveland, Dec. 1.—Keeping pace with the advance in pig iron prices, heavy melting steel scrap has been gaining steadily. Most mill consumers seem well covered for the immediate future, but dealers in seeking to cover on their contracts have been bidding up the market. Recent mill purchases include between 5,000 and 6,000 tons of high-grade melting scrap by Corrigan, McKinney & Co., some of which was taken at $15, gross ton, Cleveland, and some at $15.50. Malleable and busheling also are stronger in that market. The present unusual conditions in the iron and steel trade have localized iron and steel scrap prices to a great extent. An example of this is seen in machine shop turnings, which are turned out in great volume in the Cleveland district, while there is no large consumer for this material. Thus this description is quoted only $6.50 to $6.75 in the Cleveland market, and from $1.50 to $3 higher in all the other leading centers.

Scrap Still Advances

Chicago, Nov. 30.—Consistent increases in the price of iron and steel scrap are being registered each week, and the top of the market apparently has not been reached, although some observers believe quotations will not go much further. Recent buying of heavy melting steel by a large consumer carried the price of that item to $15.50 and other grades of scrap advanced relatively.

Most consumers have a fairly large supply and no large buying is expected to take place for some time, which may have a dampening effect and at least prevent marked advance above present levels, unless dealers who sold recently are forced to pay high in order to fill their contracts.

(*For complete prices see page* 1106.)

Railroad lists now current are as follows: Belt Railway of Chicago, 1,580 tons; Chicago, St. Paul, Minneapolis & Omaha, 4,300 tons long steel rails; Burlington, 1,827 tons; Chicago & Eastern Illinois, 450 tons; Rock Island, 5,000 tons, and Chicago, Milwaukee & St. Paul, 2,200 tons.

Prices Fluctuating

Cincinnati, Nov. 30.—The scrap market is wild and uncertain. Prices are fluctuating every day over a wide area, and it is very seldom that two dealers will quote the same on certain old materials. The general tendency is towards an advance on all grades sold. Transactions are heaviest at present on heavy melting steel, No. 1 busheling, stove plate, bundled sheet scrap and No. 1 machine cast.

Excited at St. Louis

St. Louis, Nov. 30.—The scrap market is excited and prices are advancing daily. The general feeling is that there is an actual shortage of scrap in the United States, and the first sign of severe weather is likely to hinder the movement of raw material to consumers. Nearly all grades of scrap are held tightly by dealers, who await further advances, and railroad offerings have been very light for several weeks.

The only lists before the market today are C., B. & Q., 1,850 tons; St. Louis-Southwestern, 150 tons; Toledo, Peoria & Western, 100 tons. The Boston & Maine railroad recently closed a list for 30,000 tons of various grades of scrap, but it is unlikely that any of it will move in this territory.

Wire Advanced

Prices Are Again Pushed Up $2 Per Ton

Pittsburgh, Nov. 30.—Effective Nov. 30, the American Steel & Wire Co. advanced wire products $2 a ton. The new schedule lists nails at $2 a keg and plain wire at $1.85 per 100 pounds. The last previous advance was made under date of Nov. 12, when all products were put up $1 a ton. Prevailing prices are the highest quoted since June, 1908, when material sold at $2.05 a keg. Advances announced today had been expected for some time. Demand for wire products is decidedly heavy and shipments are deferred from three to six months. Most mills are not attempting to book additional tonnages and several companies have instructed salesmen not to cover their territories.

The Furgason Mfg. Co.'s plant at Lansing, Mich., has become the property of the Michigan Pattern Works, of Detroit. The machinery and stock of the Lansing plant will be moved to Detroit.

More Building Contracts

Are Awarded, But New Projects Are Not Developing Rapidly—Quick Delivery of Bethlehem Shapes

New York, Nov. 30.—Heavy tonnages for subway and elevated railroad construction have continued of first prominence in the structural market in this district. The American Bridge Co. has been awarded formally 46,000 tons for Brooklyn elevated construction recently bid upon, and today figures were taken upon 29,000 tons for another Manhattan subway section. About 25,000 tons besides remain in the market. Outside of the rapid transit requirements, new offerings and awards are not heavy. Some prominent fabricators observe a better outlook for the speculative classes of buildings, such as lofts and apartment houses, as the result of easy money conditions and more activity in the real estate market. Fabricating prices are going up more rapidly. Apartment house work now is around $62 to $65, per ton erected. Some eastern mills today began quoting 1.75c, Pittsburgh, or 1.919c, New York, on plain material, but 1.70c, Pittsburgh, has not disappeared.

Selling at 2 Cents

Philadelphia, Nov. 29.—A further revision has been made in the prices quoted by eastern Pennsylvania shape mills so that for delivery west of Pittsburgh 2c, mill, now is named. Small sales have been put through on this basis, shipment to be made as the maker is able or in about 10 to 12 weeks. Eastern buyers continue to be named, various prices depending on the tonnage, whether they are regular customers, etc. The quotation usually is 1.70c, Pittsburgh, or 1.859c, Philadelphia, but one mill continues to do 1.75c, mill, or slightly less for delivery in this territory. New business is large and makers are forced to decline considerable tonnage. The Lenoir City, Tenn., car works bought about 3,000 tons of car material, including 1,750 tons of shapes. The order is said to have gone to a lake mill. The Pennsylvania Steel Co. has out inquiries for shapes estimated at 10,000 to 15,000 tons, covering fabricating shop needs.

Structural Shapes Strong

Pittsburgh, Nov. 30.—Finishing mills in western Pennsylvania and eastern Ohio are being driven to the limit of their capacities to meet the insistant demand of consumers, who are specifying more briskly than ever. Deliveries are deferred from three to six months and most manufacturers are not attempting to book additional tonnage. Material for nearby shipment is commanding 2c and above. Bids were received today for the new chamber of commerce building, this city, which will require between 4,500 and 6,000 tons of structural material.

Forging Building Awarded

Cleveland, Nov. 30.—The only award of any consequence made during the past week was 250 tons for the new plant of the Horsburgh Forging Co., Cleveland, which will be erected by the Massillon Bridge & Structural Co. About 250 tons of steel will be required. The structural market is very quiet and owing to the filled-up condition of most of the mills, deliveries are long deferred and business is taken very reluctantly by nearly all of the companies. Bethlehem shapes are, however, being sold at 1.70c, Pittsburgh, for delivery in four to six weeks, but other mills cannot deliver in less than 90 days.

Structural Lettings Satisfactory

Chicago, Nov. 30.—Although each week sees a comfortable tonnage of structural shapes called for by fabricators and building projects planned earlier in the season are being let to fabricators, new tonnages are not coming out for figures. Present high prices of steel and uncertainty of delivery seem to have discouraged prospective builders whose plans are not far advanced and a marked pause is apparent. Lettings during the past week include 5,000 tons for bridges for the North-Western railroad, taken by the Chicago Bridge & Iron Co., and a like tonnage for the Calumet Terminal elevator at South Chicago, which will be fabricated by the Mt. Vernon Bridge Co.

Structural shapes are quoted at 1.89c, Chicago, by large interests with practically none for sale and a handsome premium is obtained by any mill making reasonable delivery.

CONTRACTS AWARDED.

Horsburgh Forging Co. building, Cleveland, to the Massillon Bridge & Structural Co., 250 tons.

Buffalo General Hospital, Buffalo, service building addition, 100 tons to Buffalo Structural Steel Co.

Elevated railroad and connected construction in Brooklyn for the New York Municipal Railways, about 46,000 tons, to the American Bridge Co., covering the Coney Island terminal, and the Fulton street, East New York and Brighton Beach lines. About 13,000 tons for the Jamaica avenue line, upon which Conners Bros. are the low contractors, still pending.

Theater, Brockton, Mass., 700 tons, to Geo. A. Just.

Buildings for new open hearth plant of Lukens Iron & Steel Co., Coatesville, 4,000 tons, to Lackawanna Bridge Co.

Electrification of the Chestnut Hill division of the Pennsylvania railroad, 600 tons, to the Lackawanna Bridge Co.

Open hearth plant for the Interstate Iron & Steel Co., East Chicago, 1,000 to 2,000 tons, to the Lackawanna Bridge Co.

Plant for the Freeport Sulphur Co., Freeport, Tex., 700 tons, to the Phoenix Bridge Co.

Extensions to the plant of the Simplex Automobile Co., New Brunswick, N. J., 700 tons, to Milliken Bros., Inc.

Copper slabbing mill and other buildings for the American Smelting & Refining Co., Baltimore, 950 tons, to an independent shop.

Boiler plant for the Atlantic Refining Co., Franklin, Pa., 450 tons, to the Riter-Conley Mfg. Co.

Bridge work for the Lehigh valley railroad, 820 tons, to the Pennsylvania Steel Co.

Chicago & North-Western Railway Co., bridge work, 5,000 tons, to Chicago Bridge & Iron Co.

Calumet Terminal Elevator, South Chicago, Ill., 4,998 tons, to Mt. Vernon Bridge Co.

F. K. Robeon Building, Champaign, Ill., 560 tons, to American Bridge Co.

Minnesota Historical Society, St. Paul, Minn., building, St. Paul, Minn., 436 tons, to St. Paul Foundry Co.

Chicago & North-Western Railway Co., ore chutes for docks One and Two, Ashland, Wis., 421 tons, to Wisconsin Bridge & Iron Co.

Chicago & North-Western Railway Co., freight house, Sioux City, Iowa, 281 tons, to John Eichleay & Son Co., of Pittsburgh, Pa.

CONTRACTS PENDING.

Bids closed Nov. 30 for the chamber of commerce building, Pittsburgh, requiring about 6,000 tons.

William M. Davidson, superintendent of the Pittsburgh public schools, recommends the building of eight new school buildings, to cost about $3,000,000.

Boody House, Toledo, O., 3,500 tons.

Buffalo General Electric Co., Buffalo, new steam-electric power generating plant to cost $2,000,000, requiring 4,000 tons structural, bids to be taken at an early date. Plant to be in operation within a year.

Union Carbide Co. plant at Sault Ste Marie, Mich., taking bids for addition, requiring 700 tons structural.

Extensions to the plant of the Harlan & Hollingsworth Corporation, Wilmington, Del., 300 tons, general contract to Havens & Co., Philadelphia.

Two bridges for the Pennsylvania railroad, 400 tons, bids being taken.

Bridge at Uniontown, N. Y., 450 tons, bids to be received by the Public Service Commission of New York City on Dec. 9.

Two bridges for the City of Philadelphia, 300 to 400 tons, bids being taken.

Additional extensions to the plant of the Worth Bros. Co., Coatesville, Pa., 1,000 tons, bids being taken.

Section No. 2 of the Seventh-Lexington avenues subway line, New York City, 29,000 tons, Lawrence C. Manuel low bidder on the general contract. Steel bid used said to be that of the American Bridge Co.

Loft building for the Nameloc Realty Co., West Twenty-third street, New York City, 1,500 tons, bids being taken.

(*For complete prices see page* 1106.)

Blast Furnaces

Included in Plans of Bethlehem and Midvale Companies

Important additional improvements to be made to the plant of the Bethlehem Steel Co. at South Bethlehem, Pa., on land recently acquired adjoining the present works, it is learned from authoritative sources, contemplate the erection of three additional blast furnaces. Another new open hearth plant is in view as well as a number of finishing mills of various descriptions. Some of these, it is understood, will roll materials which heretofore have not been included among the products of the Bethlehem Steel Co. While it is known the plans for these improvements now are in preparation, officials of the company are not yet willing to announce full details of the extensions or when the construction work will go forward actively.

The Midvale Steel & Ordnance Co., it is understood, also has in view the erection of a third blast furnace at the plant of the Worth Bros Co., Coatesville, Pa.

Rail Buying

Was Lighter During November—Car Orders Also Come Slowly

New York, Nov. 30.—New car business has continued to slow down, owing to the unwillingness of the railroads to pay present prices for steel. New inquiries are fewer and those which have been pending are being held up or are being decided upon very reluctantly. The Pennsylvania order remains suspended and the car builders and steelmakers show no inclination to make concessions which will break the deadlock.

The Duluth, Missabe & Northern has placed 1,000 ore cars with the Western Steel Car & Foundry Co. and 250 hoppers with the Pullman Co. The Duluth & Iron Range has decided 250 ore cars in favor of the American Car & Foundry Co., but still has open 500 ore and 100 flats. The New York, Chicago & St. Louis bought 100 center constructions of the Western Steel Car & Foundry Co., and the Utah Copper Co. 100 ore cars of the Pressed Steel Car Co. The recent passenger equipment order of the Pennsylvania systems proves to be much less than at first supposed and only 33 cars were placed with the Pressed Steel Car Co., whereas about 150 were inquired for. The New Jersey Zinc Co. wants 40 hoppers. Active inquiries number about 5,000.

The Missouri, Kansas & Texas has placed 15,000 tons of rails with the Maryland Steel Co.; the Lehigh & New England, 3,500 tons with the Bethlehem Steel Co., and the New York, Ontario & Western has divided about 4,000 tons between the Bethlehem and Lackawanna Steel companies. The Southern Pacific is about to distribute 15,000 tons. Action on the 100,000 tons for French government railways recently bid upon is scheduled for Dec. 4 at Paris.

November car orders, according to statistics compiled by *The Iron Trade Review*, were about 11,500, compared with 22,500 in October; 9,000 in September; 3,000 in August; 9,500 in July; 17,000 in June; 18,000 in May; 1,150 in April; 1,100 in March; 4,000 in February, and 2,500 in January, or a grand total since Jan. 1 of about 110,500. Rail buying was lighter in November and totaled about 150,000 tons. This compares with 590,000 in October; 325,000 in September; 160,000 in August; 240,00 in July; 225,000 in June; 140,000 in May; 65,000 in April; 160,000 in March; 150,000 in February, and 200,000 in January, or a grand total this year of approximately 2,395,000.

Plans Large Expenditures

Chicago, Dec. 1.—The Rock Island railroad is considering expending $27,000,000 on its lines in the next three years. This includes $6,000,000 for double track and grade revision, $3,442,000 for car repairs and new rolling stock; $3,000,000 for tie plates, and $3,392,000 for track elevation and grade separation.

Spikes Advance

Pittsburgh, Nov. 30.—Standard railroad spikes are being held at 2.10c by some makers, and all interests are asking advanced prices for smaller sizes. The following schedule represents the market in this district: 4½ x 1/16-inch and larger, 2c to 2.10c, base; ½ and 1/16-inch, 2.10c to 2.20c, base; 5/6 and ⅜-inch, 2.25c to 2.35c, base. During normal conditions, small spikes command not more than $2 a ton above the price of standard spikes.

Not Placed

Chicago, Nov. 30.—The Duluth & Iron Range railroad's inquiry for 850 ore cars and 100 flat cars has not been placed on account of difficulty in obtaining materials. The Minneapolis & St. Louis railroad has practically closed for 1,000 additional box cars.

New Haven Equipment

The New York, New Haven & Hartford Railroad Co. has ordered $2,800,000 worth of new equipment, which includes 100 steel passenger train cars, the contract for which amounts to about $1,250,000 having been placed with the Osgood Bradley Car Co., Worcester, Mass., 33 freight engines, placed with the American Locomotive Co., Schenectady, N. Y., and two steel dining cars which will be made by the Pullman Co. The equipment will all be of the best type and the freight engines more powerful than any previously bought by the company. It will be used to improve transportation facilities that President Howard Elliott has promised.

(*For complete prices see page* 1106.)

Will Meet

Mechanical Engineers Convene Next Week at New York—Interesting Papers

The American Society of Mechanical Engineers will hold its annual meeting Dec. 7-10, in New York. An unusually interesting series of papers has been arranged for the professional sessions and early indications point to one of the most successful meetings ever held by the society.

The opening session on Tuesday, Dec. 7, will be featured by the annual address of Dr. John A. Brashear, president. A business session will be held on Wednesday morning, following which a report will be made by the special committee appointed to represent the society at the Frederick W. Taylor memorial meeting at Philadelphia, Oct. 22. Professional sessions will be held on Wednesday morning and afternoon, Thursday morning and Friday morning. The annual dinner will be held Thursday evening at the Hotel Astor.

Included among the many papers to be read are: "Gas Producers with By-Product Recovery", by Arthur H. Lynn; "Turbines vs. Engines in Units of Small Capacity", by J. H. Barstow; "Electric Operation and Automatic-Electric Control for Machine Tools", by L. C. Brooks; "Performance and Design of High Vacuum Surface Condensers", by George H. Gibson and Paul A. Bancel; "Unique Hydraulic Power Plant at the Henry Ford Farms", by Mark A. Replogle, "Safety Standards in Industrial Establishments" and the report on the code for abrasive wheels.

The Newark Foundrymen's Association will hold its usual monthly dinner and meeting at the Washington restaurant, Newark, N. J., on Dec. 8. An informal talk on "Molding Sand" will be given by a representative of Pettinos Bros.

The production of steel in Germany in August amounted to 1,157,692 tons, compared with 1,138,651 tons in July.

Modern Manganese Steel Castings

SUCCESSFULLY manufactured for a quarter-century, manganese steel is now produced in this country to the extent of 60,000 tons per year. Its wear-resisting ability, toughness and strength have brought it widely into use for vital parts of heavy machinery subjected to extreme wear and shock. Mr. McKee describes interestingly the development of the alloy, its manufacture, casting and place in industry.

By W. S. McKee

IN THE metal industries, the growth in the demand for a material possessing qualities superior to those of ordinary carbon steel has constituted one of the most significant developments of the present century. Industrial progress has been so rapid in recent years that steels which were considered the acme of perfection a generation ago are now hopelessly inadequate for many purposes. To meet this new situation metallurgists have resorted to alloys in order to modify and improve the characteristics of ordinary steel, the admixture of small quantities of certain of the rare metals having a very marked effect on their characteristics. Various alloying elements are employed, including manganese, which has been found to yield desirable results. When mixed with common cast steel in quantities ranging from 11 to 13½ per cent, it not only increases the tensile strength, elastic limit and ductility of the metal, but also adds to its toughness and resistance to abrasive action. In fact, this ability to resist wear, coupled with extreme toughness and strength, constitute the distinctive characteristics that make manganese steel valuable for many purposes at the present time.

Manganese steel has been successfully manufactured for nearly 25 years. It was first made in a small way in England and subsequently produced for the first time in the United States in 1892. At present the manganese steel foundries of this country have an annual capacity of about 60,000 tons and most of the development has occurred within the past ten years. In the early days of the industry it was considered impossible to make manganese castings successfully, weighing over a few hundred pounds, but at the present time crusher heads, rolling mill pinions and similar castings weighing up to 30,000 pounds each are being produced regularly and it does not appear that the limit of weight has been reached by a considerable margin.

As manufactured at present manganese steel is similar in analysis to ordinary first class converter metal except that it is high in carbon and unusually high in manganese, the proportions of the latter metal, as mentioned previously, ranging from 11 to 13½ per cent. This combination of elements gives the finished casting certain distinctive metallographic and physical qualities which will be detailed later.

From one standpoint manganese steel is similar to malleable iron in that the casting

A paper contributed to the proceedings of the American Institute of Mining Engineers. The author, W. S. McKee, is vice president, American Manganese Steel Co., Chicago.

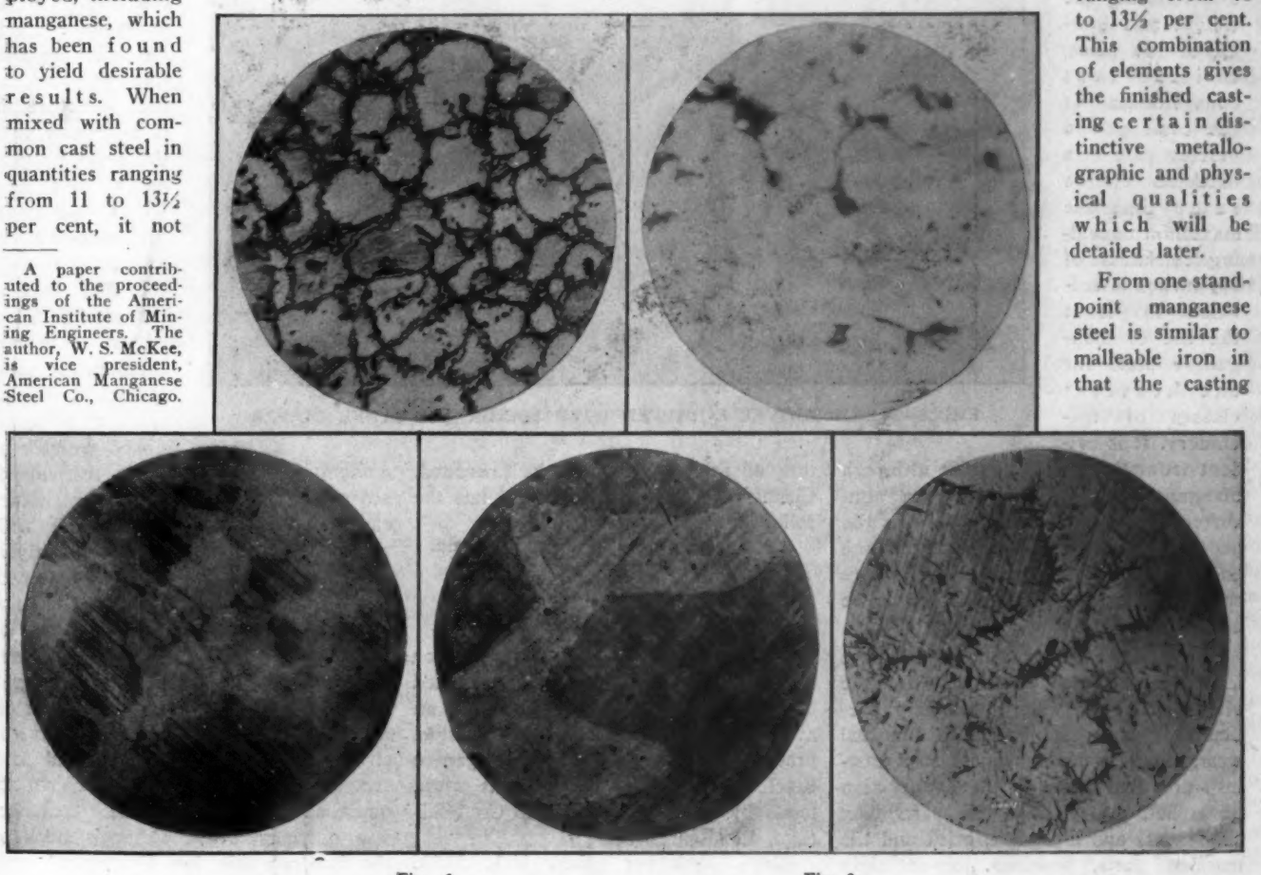


Fig. 3 Fig. 1 Fig. 4 Fig. 2 Fig. 5

MICRO-STRUCTURE OF CAST MANGANESE STEEL

Fig. 1—Structure of Manganese Steel in Cast Condition. Fig. 2—The Same Steel Incorrectly Heat Treated With Cementite Remaining. Fig. 3—The Same Steel Properly Heat Treated Resulting in a Pure Austenitic Structure. Fig. 4—Manganese Steel Correctly Heat Treated and Subsequently Heated to a Temperature of 700 Degrees Fahr. and Cooled in Air Without Change to the Austenite Structure. Fig. 5—The Same Steel Heated to 750 Degrees Fahr. and Allowed to Cool in Air Resulting in the Precipitation of Cementite, Injuring the Quality of the Metal

as it comes out of the sand is almost glass hard and very brittle and must be made ductile by an annealing or heat treating process. The heat treatment is a very essential part of the process of making manganese steel castings and must be properly manipulated to secure satisfactory results. The necessity for heat treatment limits the thickness of sections which it is possible to cast successfully with manganese steel. Originally the annealing depth was comparatively small but researches carried on during the past few years by prominent manufacturers of manganese steel have resulted in a gradual increase in the thickness of section which it is possible to treat successfully, until at present castings with walls 5½ inches thick are handled satisfactorily. Large castings are cored out to minimum thickness of 5½ inches, thus not only eliminating the internal stresses which are invariably set up in a very thick casting, but also reducing the weight and inertia of the piece, an important consideration if the casting is a moving part in a machine. At the same time the maximum annealing thickness of 5½ inches is sufficient to permit the use of manganese steel for the heaviest classes of machinery. It is evident from the foregoing that although manganese steel is made in a converter and cast in sand molds, the process is by no means a simple one and unusual experience and ability are required if successful results are to be attained.

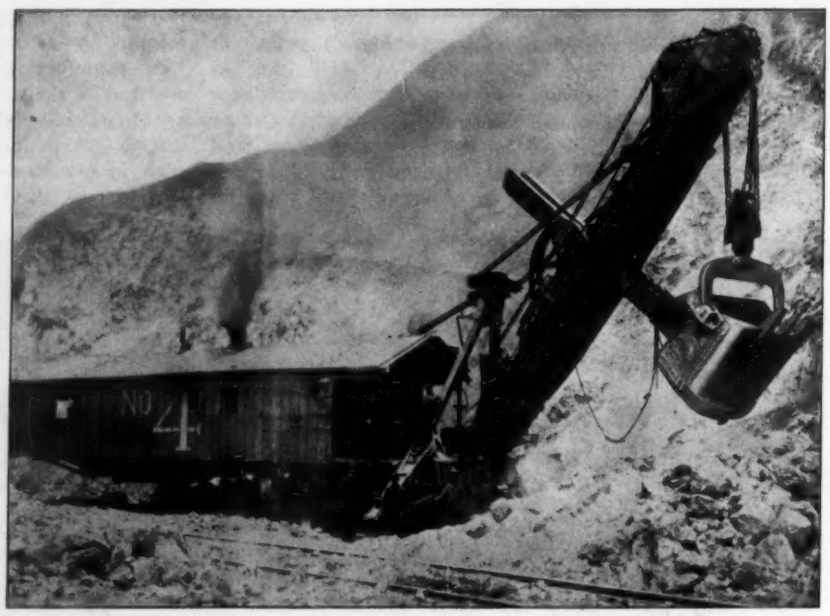


FIG. 6—STEAM SHOVEL EQUIPPED WITH MANGANESE STEEL DIPPER

The qualities of manganese steel have led to its adoption extensively for the vital parts of heavy duty machinery, particularly parts subjected to unusual wear, shock, etc. Manganese steel castings are used today in the construction of asphalt presses, ball mill parts, box car loaders and unloaders, brick and tile machine parts, bushings, cement kiln parts, chemists' supplies, Chilian mill parts, clay mill parts, coal breaking machinery, coal mining machinery, concrete mixer parts, copper converter parts, crane parts, crushing roll parts, ditching machine parts, dredge parts, elevator buckets, Fuller mill parts, gears, grab buckets, clam shell buckets and steam shovel parts, grizzly bars, gyratory and jaw crusher parts, Huntington mill parts, Kent mill parts, Kinkead mill parts, comminutor parts, ore car parts, ore dock parts, pig casting machine parts, pug mill parts, pulverizer parts, pump parts, Raymond mill parts, reverberatory furnace parts, rolling mill parts, sample grinder parts, screens, stamp mill parts, track work, tramway and cable haulage systems, tube mill parts, tumbling barrel parts, mine, skip and tram car wheels, and for numerous other purposes which it is not convenient to enumerate.

Before taking up the application of manganese steel castings to machinery, a few details covering the chemical and physical characteristics and micro-structure of this material will be presented. Chemically cast manganese steel has the following composition:

	Per cent.
Carbon	1.25
Silicon	0.30
Manganese	12.50
Sulphur, less than	0.02
Phosphorus, about	0.08

Its physical characteristics are superior to many high grade steels, as indicated by the following figures which are an average of 19 tests of manganese steel produced by the American Manganese Steel Co., Chicago. The tests were made by Robert W. Hunt & Co., Chicago, the figures being:

Elastic limit per square inch, 53,396 pounds; tensile strength per square inch, 108,460 pounds; elongation in 2 inches, 33.71 per cent; reduction of area, 38.56 per cent.

The distinctive characteristics of manganese steel are clearly indicated by the microscope. As is well known, manganese is present in all ordinary steel but the metal does not become austenitic until about 6 per cent manganese and 0.80 per cent carbon is introduced. Commercial austenitic manganese steel generally contains from 11 to 13.5 per cent manganese and from 1.00 to 1.30 per cent carbon.

In the cast state it is composed principally of austenite and free cementite, austenite being a solution of iron, manganese and the carbide of iron and manganese while free cementite is composed of the carbides of iron and manganese which remain undissolved. Free cementite is very hard and brittle and therefore manganese steel is also very brittle in the cast condition. However, upon receiving a proper heat treatment all of the free cementite is dissolved forming austenite, which is known to be very ductile and to possess a very high resistance to wear. We thus have a metallographic explanation of the chief characteristics of manganese steel. In order to obtain the austenitic structure it is necessary that the steel be given a correct heat treatment. Microscopic examination reveals the fact that if the steel is heated to a proper temperature and quenched in water, it is composed entirely of austenite. By the aid of the microscope, therefore, the proper structure can be determined and together with physical tests and chemical analysis most excellent results are obtained.

The accompanying micro-photograhs, Figs. 1 to 5, show the structures of manganese steel as cast and after treatment, magnified 100 diameters. Fig. 1 shows the structure of manganese steel in the cast condition. Fig. 2 shows the structure of the same steel heated to a temperature of 1,750 degrees Fahr. and quenched in water. The heat treatment was not correct and although much of the free cementite has disappeared some of it still remains in chunks as shown by the dark spots. Fig. 3 shows the structure of the same steel heated to a temperature of 1,800 degrees Fahr. and quenched in water. In this case the heat treatment is correct and all of the

free cementite has disappeared leaving a purely austenitic structure.

The effect of subsequent heating and cooling in air is shown clearly in Figs. 4 and 5. Fig. 4 shows the structure of manganese steel which had previously received a proper heat treatment and was afterward heated to a temperature of 700 degrees Fahr. and allowed to cool in air. The structure is exactly similar to that shown in Fig. 3 and the steel therefore has been uninjured. Fig. 5 shows the structure of the same steel heated to a temperature of 750 degrees Fahr. and allowed to cool in air. A heavy separation of cementite, shown by the needle-like particles, is clearly visible. This proves that heating the steel to over 700 degrees Fahr. destroys the purely austenitic structure, seriously injuring the quality of the metal. It is therefore imperative that manganese steel should not be heated to a temperature exceeding 700 degrees Fahr. after leaving the foundry where it was manufactured. The experiments on which the foregoing microphotographs are based were carried out with the aid of an electric furnace equipped with a pyrometer. When subjected to the Brinell test, manganese steel shows an average hardness number of about 200. The extreme outer surface of the treated steel shows a slightly lower number than at a depth of about ⅛-inch, from which point the number remains constant to the core of the casting. The lowering of the hardness number at the surface is due to the oxidization of the carbon which forms on the surface during the heat treatment. It will be noted from the foregoing that the hardness is not excessive. The toughness of the material is due to the great molecular cohesion which causes the particles to flow rather than to tear off.

The partial list of the uses of manganese steel previously given contains a large number of references to machinery used in the mining industries. The use of manganese steel for tube mill liners is a recent development which is of special interest at this time on account of the curtailment in the supply of lining materials previously used, due to the war abroad. Until the introduction of manganese steel liners, tube mills were lined almost exclusively with silex blocks imported from Europe, principally from Denmark. The pebbles used in tube mills also have been imported almost exclusively from France and Denmark. The manganese steel liners have been developed to the point where they form a very satisfactory substitute for silex blocks and experiments are now being conducted on the use of 2-inch and 3-inch manganese steel balls in place of imported pebbles.

The manganese steel tube liner now in use in this country and elsewhere was developed by S. T. Brown, now of Boise, Idaho, formerly connected with the Komata Reef Gold Mining Co. of New Zealand, and the invention is, therefore, known as the Komata liner. As indicated in Fig. 8, it consists simply of a series of plates and lifting bars securely attached to the shell of the mill by taper head bolts drawn up from the outside. The lifting bars perform a very important function, their action being similar to the bars installed in Bradford coal breakers. The bars carry the pebbles up to a point considerably beyond the center line of the mill causing an almost perfect cascading action. For this reason the pebbles maintain a spherical shape and also the great commotion and rolling action of the pebbles produces a greatly increased grinding action. The pebbles do not slip on the liner, with the result that the life of the plates is prolonged and flattening of pebbles is prevented.

The lifting bars are invariably made of manganese steel in order to resist successfully the terrific wear to which they are subjected. The lining plates are preferably made of the same material, but if local circumstances warrant, they can also be cast of semi-steel or white iron at local foundries. Under certain circumstances, this method materially reduces the cost of the liner.

In operating mills it usually is impossible to get spherical pebbles to start with and therefore a Komata lined mill will not give the best results until the pebbles have had time to classify and become approximately spherical in shape. This usually requires from 60 to 90 days.

As mentioned previously, the several pieces of the liner are fastened to the shell of the mill by means of square headed tapered bolts so that even though the plates are worn very thin they are held in place. To prevent the liner from cupping around the bolt holes, raised bosses are placed in the casting around each hole. Also when cast iron plates are used, ⅛-inch bosses are placed on the underside around each bolt hole for the purpose of preventing the liner from fitting unevenly against the shell of the mill, thus avoiding danger of breakage when the bolts are tightened. In operation the pulp soon gets behind the plates and forms a cushion or backing. The ribs, or lifting bars, are spaced from 18 to 20 inches apart according to the diameter of the mill. The filler bars which are placed underneath the lifting bars are not exposed to wear and therefore are made of soft cast iron. The joints in the bars are staggered with the joints of the liner plates to prevent the formation of grooves or channels in which the pulp might travel and wear the shell of the mill.

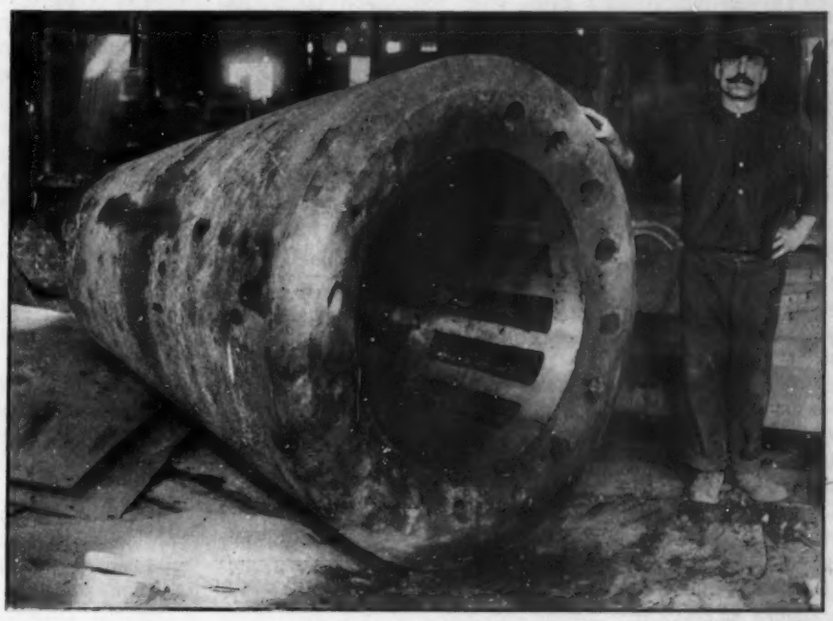


FIG. 7—BLACK VENTILATED HEAD FOR NO. 21 GATES CRUSHER

The following data on the time required to remove a silex lining and drill the shell of the mill and install a manganese steel lining in a 5 x 15-foot mill may be of interest. The figures were furnished by a prominent Nevada mining company. Six hours were required to take out the silex lining and clean the mill, three men being employed. The time of three men for four hours was

required to lay out the mill for drilling and seven hours additional were necessary to drill the shell and ends, using two air drills and four men. Altogether 182 holes were drilled in the shell and 34 in the ends, the holes being 1¾-inches in diameter. After the drilling was completed, eight hours were required to line the shell and ends, using the Komata lining for the shell and a special nine-piece liner in the ends, four men being employed. The shell liners, which were made of white cast iron weighed 13,375 pounds. None of the liners were broken in handling or in drawing up the bolts. In this instance the taper head bolts were made on a Leyner drill sharpener at a cost of about 8 cents each.

Steam shovels are extensively employed for mining ore at the present time, particularly in the iron country. The application of manganese steel to steam shovel dippers was one of the first problems attacked by the manufacturers of this material in this country, the wear on the dippers being particularly severe. Within recent years a bucket has been developed, known as the Missabe type, which consists entirely of manganese steel castings. Fig. 6 shows one of these buckets of 3½ cubic yards capacity.

The dipper body consists of but two castings, the front and back halves, thus insuring a maximum stiffness and rigidity. This design permits the construction of a large dipper with only a few rivets, offsets or shoulders being provided to relieve the rivets from shearing strain. The bail brackets are set at an angle conforming to the line of pull on the bail. They are butted against shoulders or offsets which are formed integrally with the sides of the front casting, thus relieving the bail bracket rivets of the digging strain. The bail brackets are riveted to the front half of the dipper, the joints between the front and back halves being placed at the rear of the brackets, thus throwing all of the digging strains on the front castings and relieving the rivets at th joints from shearing stresses. The teeth, which are easily renewable, are of cast manganese steel.

Last year several dippers of the Missabe type were furnished to the United States government for use on dredges working in the Culebra cut, Panama Canal. They are believed to be the largest manganese steel dippers ever made, their capacity being 10 cubic yards each. The weight of the empty dipper is 37,600 pounds. The overall dimensions of the dipper are 9 x 9 x 10½ feet. The lips are 3¼ inches thick and the fronts are the same thickness underneath the teeth. Between the teeth the fronts are 1½ inches in thickness, the thickness at the bottom band being 3¼ inches. The backs are 1¼ inches thick, except at the bottom where the thickness is increased to 3¼ inches.

Fig. 7 shows a cast manganese steel ventilated head of the Black type suitable for a No. 21 Gates gyratory crusher. This casting weighs 21,360 pounds. As shown in the illustration, it is provided with a series of vertical flues or cores running from top to bottom which permit a circulation of air between the wearing surface and the shaft. This tends to prevent the transmission of the heat incident to crushing from the wearing surface through the shaft. The flues flutes also increase the resiliency of the casting, resulting in increased crushing efficiency and slower destruction of the wearing surfaces. As compared with a solid pressure head the

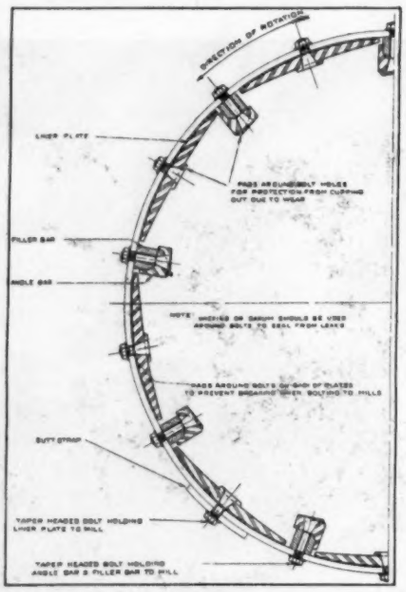


FIG. 8—HALF SECTION OF A TUBE MILL FITTED WITH MANGANESE STEEL KOMATA LINING PLATES AND LIFTING BARS

weight is reduced from 20 to 30 per cent. Numerous other types of crusher heads are made from manganese steel and this material also is particularly suited for the wearing parts of heavy jaw crushers.

Where the loads are heavy, manganese steel is now being extensively employed for gears and it may be interesting to some readers to learn that for the past two years manganese steel spur gears have been made with the teeth ground theoretically correct. Ground gears can now be provided up to 44 inches pitch diameter with a 10-inch width of face. Many ordinary steel gears are cut with a range cutter which does not leave the rolling contact theoretically correct, whereas in grinding manganese steel gears a trimming arrangement is placed on the grinder for the purpose of dressing the emery wheel to the proper contour of the tooth space, so that when the making gears are meshed, each tooth is provided with a perfect contour on which to roll.

After two years continuous service, the wear on a set of heavy high speed manganese steel nest gears recently was measured. These gears had a 10-inch face and when new the tooth measurement at the pitch line was 0.684 inch. At the conclusion of the two year service period, the tooth measured 0.601, the wear being less than 0.01 inch. These gears are still in service after having more than earned their original cost, and barring accident they will be good for many years to come.

Manganese steel now is employed extensively in the manufacture of rolling mill machinery; it has been found particularly suitable for the pinions on heavy roughing and blooming mills. Many other machine parts around steel mills are now being made of manganese steel, including pipe drawing balls, chafing plates, sprockets, cams. draw chains, unloader chains, conveyor chains and buckets, screens, pulverizing hammers, dry and wet pan parts, crusher castings, etc.

As mentioned earlier in the course of this paper, special experience and knowledge is necessary for the production of manganese steel castings. For instance, although the shop practice is fundamentally similar to that of an ordinary steel foundry, a number of factors not vital in ordinary work must be considered if successful results are to be obtained and frequently it is essential that attention be given to these considerations in the pattern shop as well as in the foundry and machine shop.

Among other points, the shrinkage must be taken into account inasmuch as it amounts to $\frac{5}{16}$-inch per foot as against $\frac{3}{16}$-inch to ¼-inch in ordinary practice. The pattern therefore must be made with proper shrinkage allowances and for this reason the founders frequently prefer to make their own patterns from original drawings supplied by their customers. Where patterns are furnished, they sometimes have to be rebuilt.

The allowances for shrinkage are not confined simply to the dimensions of the pattern but also include the distribution of the metal in the casting. This is an important matter, since the heat treatment and cooling produce strains which must be taken care of. At times it is necessary to add metal to a casting temporarily to withstand shrinkage strains, such additions of metal being removed in the machine shop before the casting is shipped. Manganese steel, while unusually strong, is also comparatively expensive, so it is essential to use

the metal economically, this constituting another reason why designs or patterns occasionally have to be altered before they are suitable. While a majority of the patterns used are of wood, it has been found advantageous to use metal in many cases where great durability is required.

The melting practice also has its special features which make it distinctive from ordinary foundry practice. Side blow converters are employed and the 80 per cent ferro-manganese with which the steel is alloyed is melted in separate crucible furnaces. The melted alloy is placed in the bottom of the ladle and the steel from the converter is poured in on the top, enough ferro-manganese being used so that castings will show about 13 per cent manganese when analyzed. This is an average figure; the exact quantity of manganese varies somewhat with the nature of the work and here, again, the judgment of the works manager comes into play.

The manganese acts as a strong scavenger, removing the gases and impurities from the metal, leaving it condensed and homogeneous. Before the molds are poured, the ladles are allowed to stand for a time to permit the alloy to perform its function, after which the accumulation of slag is removed.

The raw materials used include selected low phosphorus pig iron and low phosphorus steel scrap. These materials are similar to those used in the ordinary bessemer steel foundry and some careful selection is necessary to secure uniformity in the product.

The annealing process is particularly important and special expensive equipment must be provided to take care of this phase of the work. The details of the annealing practice have been learned entirely by experience. The annealing temperatures and the time the work is allowed to remain in the furnace vary considerably, depending upon the nature of the piece; the temperature ranges from 1,600 to 2,200 degrees Fahr. and the time of anneal from four hours to 24 hours.

How Castings Are Handled

Owing to the fact that the castings are brittle when they come from the sand, the gates and risers can be broken off as in malleable foundries. The cores are removed with pneumatic drills and the exterior surfaces are freed from sand, cleaned and trimmed by grinding.

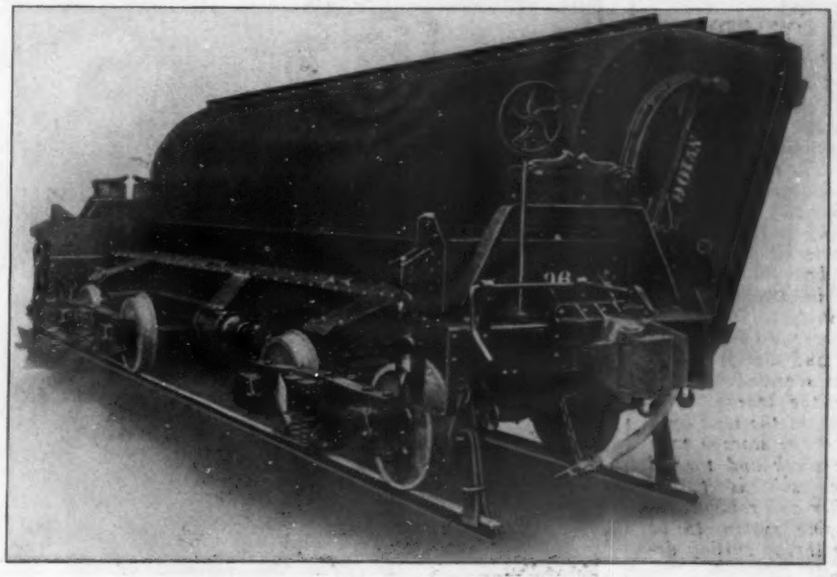
After the foundry work is concluded, castings which are to be accurately finished are taken to the machine shop for final operations. Manganese steel, although ductile and in a comparative degree soft, is also exceedingly tough and dense; for this reason ordinary machining methods are unsuccessful and grinding must be resorted to. For much of the work, special grinding equipment is necessary. Holes more than 1¼ inches in diameter are cored out of the castings and ground to size with special wheels. When it is necessary to drill smaller holes or to cut threads, soft steel or wrought iron inserts are set in the molds at the desired points like chaplets and the metal is cast around them. Inserts or bushings are not necessary where keyways are cut except in small holes, since these can now be ground successfully. Sometimes bushings are set in the hubs of gear wheels, etc., when it is desired to machine them by ordinary methods. Liberal allowances of metal are made for grinding in order to minimize the danger of spoiling work in the machine shop.

It is necessary for the shop foreman to continually exercise his judgment; coarse wheels and heavy cuts are used so that metal is removed rapidly, although by no means as easily as would be the case were it possible to use ordinary cutting tools.

A complete manganese steel castings plant, therefore, includes a foundry with special equipment for melting ferro-manganese and annealing bulky castings, a pattern shop of ample capacity and a machine shop thoroughly equipped with heavy duty standard and special grinding apparatus to meet demands on it.

V-Shaped Ore Car Prevents Leakage

IN HANDLING ore from the mine to the smelter, care must be taken that none is lost in transit. For this reason, mine operators and car builders have given considerable attention to the design of ore-carrying equipment. The prevention of any leakage of the ore was the governing factor in the design of the new V-shaped ore car brought out recently by the Orenstein-Arthur Koppel Co., Koppel, Pa. The car is without doors, affording no chance for the material to escape through openings or cracks. The car shown in the accompanying illustrations was furnished to a large western copper mining company, whose ore contains considerable quantities of the precious metals. The operations are conducted on a large scale and the cars provided are of unusually large capacity. The car shown in the accompanying illustration has a capacity of 300 cubic feet. The car is dumped and righted mechanically. Heavy forged loops are provided on the side of the car, for engaging crane hooks. The car is shown in its dumping position. These cars are constructed in accordance with Master Car Builders' practice and are provided with standard arch bar type of track and air brake.



V-SHAPED ORE CAR IN DUMPING POSITION

Electric drive in steel mills is described in a leaflet issued by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

For Fishing Rods

AN ingenious device was suggested recently by one of the foremen of the Buffalo Bolt Co. for locating rods in the hearth when they have parted due to improper welding. This device is similar to a wrench and is about 12 feet long. A 1-inch pipe, about 9 feet long, carries a collar at one end and a forging at the other. Another forging is held on the end of a ½-inch rod which extends through the pipe to a collar six inches beyond the other end of the pipe. Between the two collars is a spring. The rod extends through the collar and is turned to form a handle. By pulling the handle the forgings can be brought close together, firmly gripping the rod after it is found.

How to Heat Wire Rod by

MANUFACTURERS of small-sized iron and steel products are constantly confronted with the problem of increasing output and decreasing costs through the faster operation of machines, the elimination of scrap and the continuity of stock charging. In the manufacture of bolts, for instance, where the individual output of one machine will reach 70,000 to 80,000 pieces daily, it is imperative that the stock be supplied regularly, rapidly and at a uniform temperature in order to meet the speed at which the machine is driven.

Furnaces for heating rods, which will be formed into bolts and screws, are usually designed to handle rods about 20 feet in length. The rods are charged cold at the end away from the machines and after being heated are pushed into the header by a new cold rod.

The Buffalo Bolt Co., North Tonawanda, N. Y., however, has designed and now is operating a rod heating furnace which differs radically in principle from the ordinary type of furnace. The rods are put into the furnaces in coils, the ends of the various coils being welded together, so that a continuous band of metal is drawn through the furnace and into the header at all times. The size of the furnace required to heat the coils, is of course considerably less than the long rod furnaces. Of almost equal importance, is a saving in scrap due to metal being handled in a continuous rod. The claim is advanced by officials of the Buffalo company that it would require a furnace 80 feet long to heat a straight, continuous rod sufficiently and to supply the header as rapidly as is done in this 5-foot hearth, where the rods are handled in coils.

Three of these furnaces are in operation at the North Tonawanda plant, the battery being shown in Fig. 3. The furnaces burn fuel oil. They are 7 feet square, the fire box being 5 feet square. The fire brick in the corners is laid so as to present a circular surface in order to give the flames a swirling motion. The furnaces were designed by the Buffalo Bolt Co. Arthur L. Stevens, Chicago, has re-designed the furnaces for operation on gas, which will be supplied by two new gas producers now being installed by the Smith Gas Power Co., Lexington, Ohio.

The new furnaces will be about 12 feet high, the upper portion forming a regenerating chamber for pre-heating the air and the lower half, the heating chamber. The air will be led down on one side through four ports, across the fire box and up through ports on the opposite side. The waste gas will escape from the top of the furnace. The shop roof is of monitor type and the waste gases can escape directly into the outside atmosphere.

The new furnace is a substitute for the drag type furnace formerly employed by the Buffalo Bolt Co. The outside of the furnace is made up of boiler plates, with angle iron reinforcement. The front which is cast iron, is made up of three pieces and is bolted to the boiler plate sides. Next to the boiler plate is a 4-inch layer of cork brick. Two layers of fire brick surround the fire box, the brick being laid flat. The single cork brick layer provides sufficient insulation. Radiation losses from the furnace are small and little heat can be felt on the outside of the boiler plates, even after the furnace has been operating for some time. In re-designing the furnace for burn-

FIG. 1—WIRE ENTERING HEADER

Washing System

FINISHED products are washed at the plant of the Buffalo Bolt Co., in carload lots. After the bolts, nuts and screws have been tumbled they are loaded into cars and run under a washer. The washing system includes a soda water storage tank which is heated by exhaust steam, controlled by a thermostatic regulator. The water is piped from the tank and is brought over the industrial tracks in two swinging pipes which end in tees. Two perforated pipes are screwed into these tees. The grease and dirt from the carload of bolts or screws is washed into a pit under the tracks. The water is lifted back to the tank by a centrifugal pump. The storage tank is cleaned once a week and the oil drawn off. This soil is passed through an oil filter and returned to the general pumping system to be used again in the thread cutting department.

od by Continuous Coil Method

By R. V. Sawhill

ing gas, provision is made for a double arch over the heating chamber. The two arches will be 4 inches apart, and the top arch will support the regenerator. This arrangement will permit the entire lining to be replaced without disturbing the regenerators. Each of the four ports on either side will be formed by leaving out two vertical bricks, giving a 4-inch square opening.

Considerable care was taken in designing this furnace to facilitate the laying of the fire brick. The fire brick was laid first and the size of the furnace was then adjusted to suit the brick. This method eliminated any cutting and fitting of the fire brick.

The inside temperature of the furnace is 1,800 degrees Fahr. The waste gases escape at 300 degrees.

In operation, the coils are picked up by a monorail and placed on the stationary taper drum *A*, Fig. 3. The rod is led through an eye bolt for overhauling and then wound around a power-driven drum. When one coil has been completely wound around this drum, the spring pins which hold it in place are removed and the coil is pushed over onto another drum, *B*, Fig. 3. The end is welded to the end of the preceding coil and the rod then is led through the revolving disc, *C*, and onto another stationary drum which fits snugly against a ring in the furnace. The rod is then led through the ring at *D*, Fig. 2, onto the boiler tube holder. The incoming rod is held tightly against the boiler tube arm by the weight *E*, preventing any of the rear coils from leaping over those in front. The coils are gradually forced down over the boiler tube arm, by the incoming rod, and when released from under the weight, are prevented from slipping off, by the shape of the tube which is turned up at the ends. The rod is drawn off from the tube through the furnace, and to the feed rolls of the header as shown at *F*, Fig. 1. The coiler is driven by a 3-horsepower motor.

The stationary taper drum is 30 inches in diameter. It has a large flange at the bottom against which the coils rest. The drum is tilted in order to keep the rod firmly against the flange. The rod is overhauled in passing through the eye bolt. If the rods are tangled and jam against the eye bolt, the motor is automatically stopped through an overload release. The workman makes the necessary adjustments and attends to starting the motor. The power driven drum onto which the rod is led from the eye bolt, is 30 inches in diameter. The spring pins holds the rod on this drum until the entire coil has been overhauled and rewound. The ends of the coils are welded on the small portable welder shown at the right in Fig. 4. This welder is provided with an extension arm so that the weld can be made near the drum.

All of the drums and the revolving discs are carried on a center spindle which is supported on trunnions at the end away from the furnace, and at the furnace end rests on roller bearings inside of the large revolving disc. This spindle extends through the disc and at the furnace end carries the stationary drum which carries the rod before it is led into the furnace. The revolving disc rests on wheels, which in turn are supported by the frame of the coiler. This disc is cast iron and is riveted to the cast iron drum, which receives the rod before it passes through the disc. This drum is chain driven from a sprocket gear off the cross-shaft at the back.

The operation of the various drums is separately controlled through clutches and bevel gears so that any drum can be stopped independently. Three speeds ahead and reverse are secured through the gear box shown under the motor

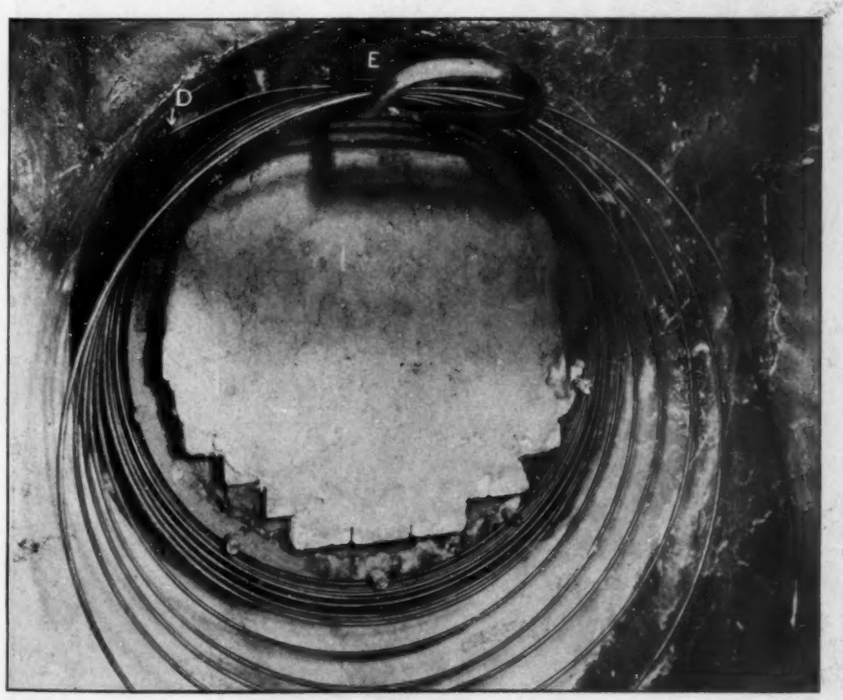


FIG. 2—WIRE ENTERING FURNACE

Convenient Truck

THE box shown in Fig. 1, which receives newly headed stock, is transferred from the header to the industrial track, by a novel truck. The two arms of this truck are turned upward at the end for gripping the lugs, one of which is shown at the side of the basket. The sides of the truck are held together by two bars, one of which the workman uses for pushing the truck while the other carries a small hook which grips the rim of the box and prevents it from tipping. This truck is about 6 feet long and the ratio of leverage is 20:1, so that the 1-ton buckets are handled easily.

Discards Water Bucket

THE small trough shown at the extreme left in Fig. 1 also was suggested by one of the employes for doing away with water buckets for cooling the tools. A 6-inch pipe was cut in half and imbedded in the concrete floor. This half sector of pipe rests at an angle. The discharged water from the coiler is led in at the lower end. The slope of the pipe is such that the water cannot overflow. It is long enough to permit hooks and tongs to be immersed in water, while at the same time they are inconspicuous.

FIG. 3—ARRANGEMENT OF COILERS, FURNACES AND HEADERS

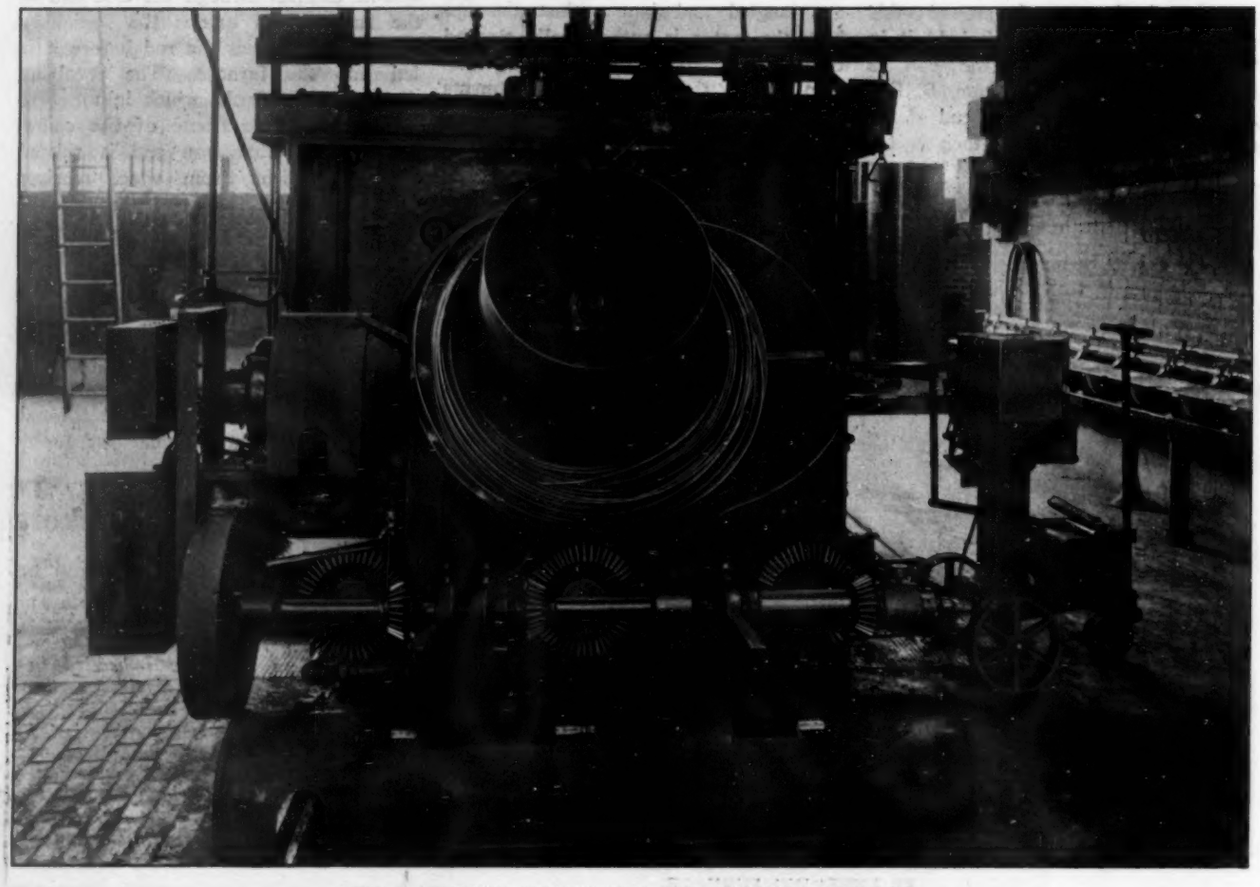


FIG. 4—DRIVING MECHANISM AND ELECTRIC WELDER

in Fig. 4. This arrangement provides three sets of speeds on the revolving disc so that the speed of revolution of this disc can be accommodated to the size of the stock being handled through the furnace. When large rods are being handled the stock, of course, is used up more rapidly, so that the disc must be driven at a higher speed in order to keep the furnace properly charged.

The flexibility of this arrangement is of great importance in this type of furnace, as it permits the operator to adjust the amount of stock being put into the furnace to that drawn out by the header. At any time the disc can be stopped to prevent the furnace from being overcharged. This flexible adjustment overcomes a major difficulty that had been encountered by some designers who worked on the principle that the amount of stock leaving the furnace must at all times equal the amount charged.

The stationary drum which rests against the ring in the furnace, is made up of eight cast iron sections fitted together like a piston ring. One of the sections is pierced to permit the rod to enter the furnace. These sectors are supported and held by studs which separate them from the disc. The distance between the disc and the drum can be varied, by adjusting these studs, but in usual practice it is maintained at 4 inches, in order to provide sufficient air insulation between the disc and the drum.

The back of the furnace, shown in Fig. 2, is a "dead pocket" so that there is less heat and greater protection for the equipment. Also, the rod is heated gradually. The weight shown at *E*, Fig 2, is water cooled. Water reaches the weight through the flexible copper tubing, shown at the top of the furnace in Fig. 4. The bottom of the weight is so shaped as to hold the rods firmly after their entrance into the furnace and to release them gradually as they slide down toward the end of the boiler tube. The bottom of the weight is curved at the end toward the furnace so that the pressure on the rods is gradually released. The boiler tubes are of ⅜-inch steel. The wear on these tubes is said to be small as the wire becomes slippery as it is heated.

The entire arrangement of drums, disc and motor is mounted on four wheels running on a short track. There are two set screws on the face of the furnace, one striking the carriage on either side. Through these set screws, the coiler can be moved toward the furnace to follow the wear of the furnace ring. The wear on the disc and driving wheels also is automatically compensated so that all of the operating parts are in proper relation at all times.

The wheels which drive the large revolving disc are water cooled through pipes mounted on the rear of the furnace. This water is led through a sewer back to a condensing pump where it is cooled and repumped.

The spring in the rod, caused by the manner in which it is pulled off of the boiler tube holder, is taken out after it is run through the feed rolls on the header. This spring occurs once in every 10 feet, this distance being the circumference of each of the coils.

The three gear boxes shown on the cross shaft in Fig. 4 are separate from the main frame, being bolted to it. By this arrangement, these boxes can be taken off, the gears pulled out and the machine quickly dismantled for making repairs. The bevel gear shown at the right on the cross-shaft in Fig. 4, is mounted on a sleeve which is loose on the shaft. An ingenious system of lubrication is provided for oiling all of the sleeves and the four-jaw clutch. The sleeves are bored out for the entire length, and phosphor-bronze bushings installed. An opening is left between these bushings, forming a grease pocket. The cover, which has been taken off in Fig. 4 to show the driving mechanism, ordinarily is removed once in six months to refill these grease pockets. Holes also are bored in the drums and grease cups fitted for lubricating the center bearings. The power cable shown in Fig. 4 is flexible to compensate for the movement of the carriage.

An interesting 30-day test recently was run by the Buffalo Bolt Co. to determine the comparative efficiency of these coilers. The test was conducted on the group of three coilers and on an older type of drag furnace. The same stock was used in each case. With the old equipment 1,098 pounds of scrap were produced, while with the coiler only 105 pounds of scrap were made. The average efficiency of the three coilers was set at 93.2 per cent. On another test, a miscellaneous assortment of rods was handled, making bolts from 5/16 x 2 inches up to ½ x 6 inches. The total saving on the coiler compared with the former method of

Cost Records on Each Machine and Product

NO PHASE of the operation of the Buffalo Bolt Co. has received more attention than the maintenance of proper cost records. The troublesome problems of overhead, maintenance, indirect overhead, direct labor, materials, depreciation, etc., have been studied for years. As a result, the cost keeping method now followed permits an exact record to be kept at all times of the cost of operating any individual machine or of producing any individual unit of product. There are more than 3,000 machines in the plant, each of which is numbered. All supplies furnished to any machine are recorded by this number. Each machine operator is furnished with two sets of tools. This arrangement avoids any possibility of costly shutdowns while the workman is going to the tool room to replace a broken part. Costs are determined for each individual operation. The record for the wire drawing department, for instance, includes the cost of pickling, lining, baking and annealing, wire, wire drawing, and wire straightening. Under each of these headings in turn, is shown the cost of labor, supplies furnished and tonnage handled. From this record, the cost per ton of each operation is determined. In this department also, the acid cost per ton and the amount of rejected wire are recorded. An accurate record is maintained of the repair work on any machine. Cards are stamped both when the job is started and completed, thus showing at a glance the time consumed in making the repairs. The labor cost and cost of materials for this repair work is kept on these cards. At the end of the month, the cards for any one machine are grouped and a monthly record kept of the repair cost for each individual machine. At the end of the year, this cost is totaled and transferred to a yearly cost card. The company now has individual repair cost cards which in some cases cover machines that have been operated for 25 years. The value of this system can be appreciated from an inspection of these cards. They show that the repair cost on any machine runs in regular cycles. Following the general rebuilding of a machine, the repair cost will be low for a few years. It will increase as the machine becomes more subject to breakdowns, due to its long operation. The repair cards show clearly that the costs mount again as the need for a new general overhauling of the machine becomes apparent.

production, is said to have been $16.48 a day. This figure was reached after provision had been made for all expenses including a larger overhead on the coiler, due to its greater initial cost.

The Buffalo Bolt Co. has received a basic patent on the principle of this furnace as well as patents on the particular mechanisms.

The headers shown in Figs. 1 and 5 are of the company's own design. The frame is of cast steel with cast steel slide and connecting rod. The crankshaft and ground bearing are of chrome-vanadium steel, oil tempered and annealed. All of the bearings are lined with phosphor-bronze except the main slide which operates on cast iron liners. The crankshaft is counterbalanced to take care of the reciprocating parts. The fly wheel is cast iron and drives the head through friction discs. The feed mechanism is driven through a ratchet and pawl. The two feed wheels are 10 inches in diameter.

These machines operate at from 126 to 226 revolutions per minute depending upon the length and size of piece being headed. They were designed especially for use with the new coiler and furnace as the headers formerly employed by the Buffalo company could not be driven at more than 150 revolutions per minute. Each header is driven by a 7½-horsepower motor. Rating the maximum efficiency of the headers at one piece for each revolution of the fly wheel, these headers operate at an efficiency of 97 per cent. The best record attained by these machines was set recently when one machine turned out 88,608 pieces in a 9-hour working day. With the headers formerly employed by the Buffalo company, 40,000 bolts were headed in a 9-hour day, using a hand operated furnace and 12-foot stock. There was a 4-inch loss on each rod, where it was grabbed by the tongs. With a drag furnace running on 16-foot stock, there was an average loss of 2½ inches on each rod, due to the ends of the rods being too small to form a bolt. The production with these furnaces and the former type of headers, was 55,000 bolts a day. With the new type of header and furnace, where the coils are welded together, the production has been pushed up to 88,000 bolts daily. The saving in scrap alone is said to pay for the labor employed in operating the furnaces and coilers of the plant. The gas producers being installed by the Smith Gas Power Co. were especially designed. The equipment comprises two three-section producers. They will operate on run-of-mine soft coal and will furnish gas for the rolling mill and forge shop. The gas will be taken from the producers and passed through two blowers, each driven by a 9-horsepower steam engine. The exhaust steam from these engines will be used for saturating the incoming air to the producers. These blowers will produce a pressure of 2½ pounds on the gas mains. The gas will be forced through glass-wool tar extractors and then led to primary and secondary coolers and then into a 24-inch cast iron gas main which will distribute it to the different departments.

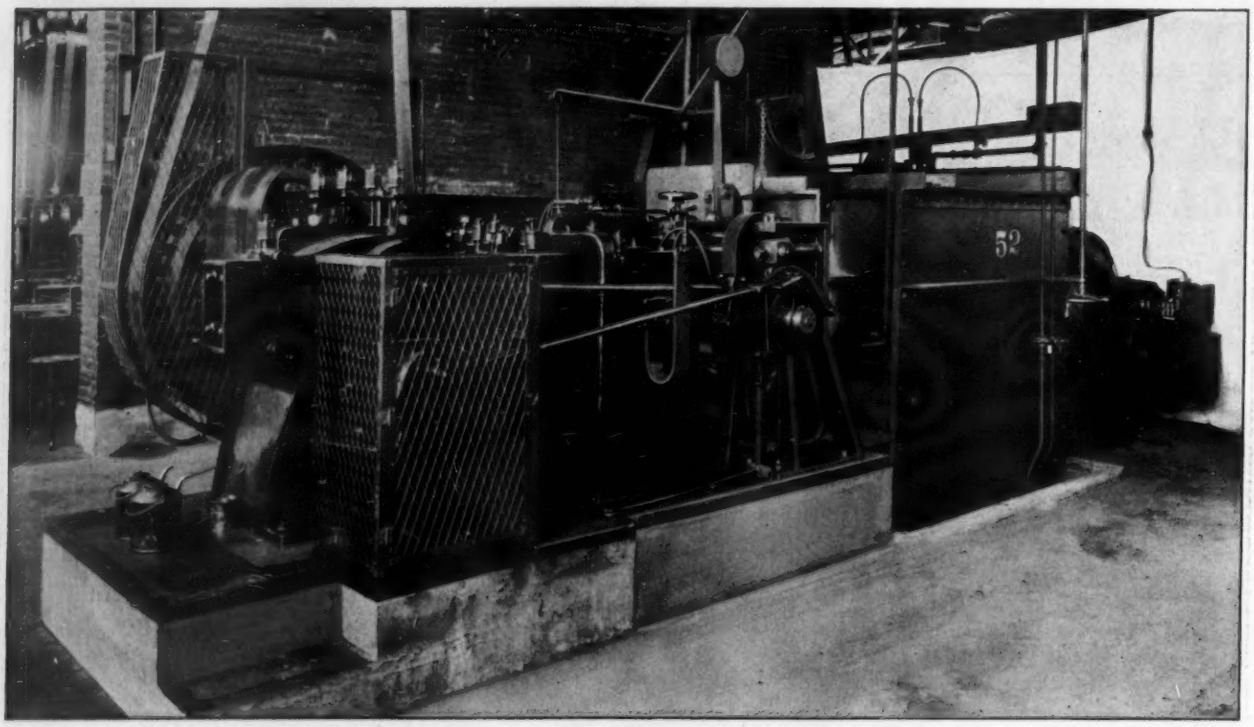


FIG. 5—CLOSE VIEW OF HEADER

The producers will be located in a 60 x 80-foot brick and steel building, which is now under construction. At one end of this building will be located steel coal storage bins with a capacity of 300 tons. These bins will be mounted on towers. The coal will be discharged from cars into hoppers under the railroad tracks, passing through a crusher before being elevated to the storage bins. The coal will be fed by gravity from the bins to an electrically driven 20-ton coal larry. This larry will run on craneways over the producers, and will feed the automatic stokers on top of the producers. No hand shoveling will be required in handling the coal from railroad cars to the producers. All the producer grates will be operated by compressed air so that the entire operation from coal car to gas, including the removal of the ashes, will be handled and directed by one man stationed on the producer platform. These producers will have a combined capacity of 1,500,000 cubic feet of gas per hour.

A water cooling pond, 100 feet square and 12 feet deep, has been provided to operate in connection with the rolling mill and gas house. All of the water used about the plant will be returned and cooled in this pond, which has a capacity of 600,000 gallons.

Through a rearrangement of the equipment for cleaning the bolts, nuts and screws, three men now handle the work formerly done by 33 men. Ten tumbling barrels, five of 1-ton capacity and five of 5-ton capacity, are located

(*Continued on page* 1106b)

New Rail Ender and Vertical Miller

A NEW rail ending machine has been brought out by the Newton Machine Tool Works, Inc., Philadelphia, to be operated in conjunction with a machine for drilling splice bar holes in open hearth rails of high carbon and manganese content. This tool was designed for a production capacity on T-head rails, in excess of the drill capacity. As shown in Fig. 1, it is equipped with lifting hooks, so as to be readily transportable from one part of the mill to another, in order to handle various lengths of rail. The cutter head is of the three-tool type and is designed for use with either solid cutters or tool holders. The rail to be handled is clamped in the chuck, which is fitted with hardened, serrated plates, its mouth being beveled in all directions to facilitate the entrance of the rail. The clamp used is of the air operated type and is said to maintain a pressure of 32 tons. It is operated by the valve shown in the foreground in Fig. 1. The adjusting screw on the air clamp is provided with a hand wheel. The motor drive is mounted on the top of the machine, operating the latter by a 10-inch belt through a phosphor bronze worm wheel and hardened steel worm, the latter being double-keyed to the spindle which is half the diameter of the cutter head. The feed is operated by a stationary screw and revolving nut. The thrust is cared for by enclosed ball bearings 8 inches in diameter. The spindle has a 2¾-inch forward movement, with hand adjustment, and four changes of feed. An adjustable automatic stop is provided, so that the spindle cannot be jammed at either end. The bearings are capped and bronze-bushed to compensate for wear. All gears are fully enclosed, the principal drive and feed gears running in oil. A circular pump and distribution system serves to cool the tools. Cored openings in the base provide for the ready removal of chips from the work. Fig. 2 shows a vertical milling machine recently brought out by the Newton Machine Tool Works, Inc., for milling off the solid ends of shrapnel. It is said that the special chuck or fixture for holding the work allows of continuous operation. This fixture has a capacity of 60 pieces, being sub-divided into pockets, each of which holds five forgings clamped by means of a single screw. It is claimed that finished work may be removed and rough shells clamped in the fixture without the necessity of stopping the feed. The cutter is 10 inches in diameter, the in and out adjustment of the table being 10 inches. The spindle diameter is 5 inches and that of the table is 54 inches. The diameter of the driving worm wheel on the spindle is approximately 18¾ inches. The spindle boring is 24 inches in length. Three changes of circular feed, with hand circular rotation and hand in and out adjustment, are provided for the work table.

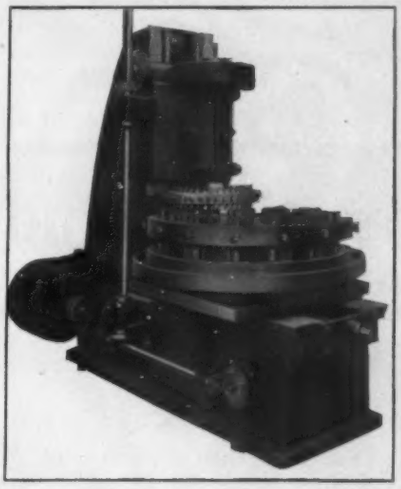


FIG. 2—VERTICAL MILLING MACHINE

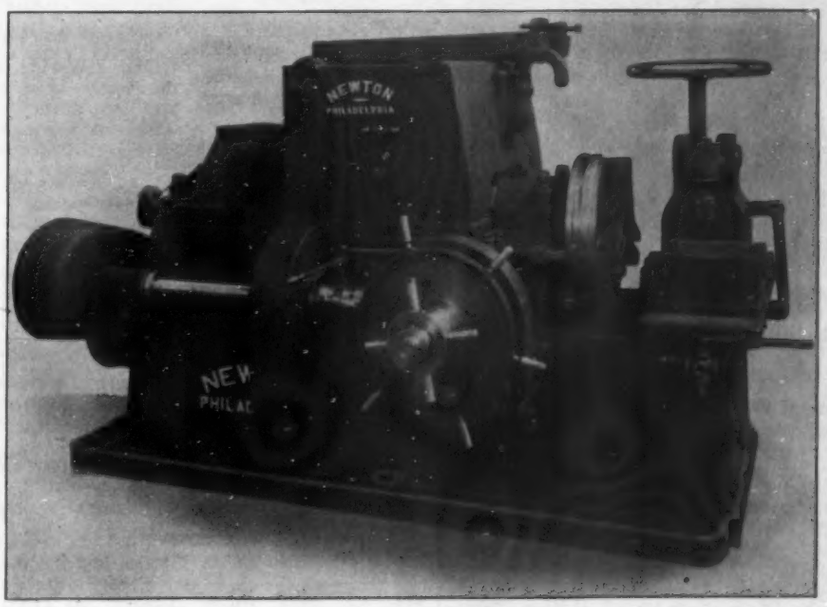


FIG. 1—NEWTON RAIL ENDING MACHINE

The demands and vicissitudes which have been developed by the necessity of filling immense war orders, are responsible for the invention of many ingenious new tools and appliances, of which this Newton shrapnel head miller is an excellent example.

Announces New Truck

A new light delivery truck with worm drive has been recently designed by the Kissel Motor Car Co., Hartford, Wis., to meet the needs of machinery manufacturers, rolling mill, blast furnace operators and others. This truck is equipped with a 32-horsepower, 4-cylinder motor, cast enbloc, with enclosed valves. The crank case is constructed in halves, permitting the lower section to be removed without disturbing any other part. The drop-forged crankshaft and integrally forged cam shaft are of heavy design to withstand severe usage. Lubrication is afforded by a combination of the splash and force feed system, the oil being strained each time it enters the oil pump. Positive gasoline feed is insured by a vacuum system. A cone type leather-faced clutch with adjustable spring insert is employed. Ignition is supplied by a high tension magneto. The truck is equipped with a three-speed transmission and equalized foot and emergency brakes. The worm wheel and differential are mounted as a single unit in the center housing of the rear axle, the

weight of the truck being carried on heavy steel tubes. Semi-elliptic springs are used both front and rear. Special bodies may be furnished in place of the standard express bodies commonly supplied.

Single Head Bar Cutter

A new single head cutting-off machine recently placed on the market by the Southwark Foundry & Machine Co., Philadelphia, is designed to cut bars of various diameters by changing the hardened steel slide bushing. Its sliding head, operated by means of an air cylinder, will cut bars up to 48 inches in diameter and 17 feet long. The main frame of the machine is built of structural steel. The cutting-off head is equipped with three air-operated cutting-off tools. Provision is made in the frame casting for an additional bottom tool, should this be required. In order to prevent the sagging of small bars when cutting at the extreme end, a supporting rest has been furnished. It is claimed that the machine can cut 55 carbon steel bars of 3½-inch diameter in 35 seconds.

After using a fleet of five trucks manufactured by the Kissel Motor Car Co., Alexander H. Revell & Co., Chicago, have placed an order for four additional trucks of the same make.

Sparks from the Grinding Wheel

By H. O. Tair

NEGOTIATIONS for the control of a $10,000,000 "dryo-aluminum" plant are chronicled by the *Chicago News*. Some gifted metallurgist missed his calling by choosing the reporter's life.

* * *

What's in a name? Munition manufacturers believe they have uncovered a big bomb plot in the finding of a trunk full of dynamite at the home of Eugene English.

* * *

A sorrowful salt named Furuseth
The shipping inspectors abuseth;
His boomerang bill
They enforce with a will—
While Andy the nation amuseth.

* * *

"Chemists Will Hear Interesting Series of Discussions," declares a contemporary. A glance at the list of papers to be read makes one realize that de gustibus certainly is non disputandum.

* * *

Some folks have iron wills, observes H. C. E., while others have pig iron ones.

* * *

At Youngstown the workers in the munition plants, with ghastly jocularity, refer to shrapnel as "Dutch Cleanser."

* * *

To hear some foundry foremen talk to their men, one wonders how the sulphur content of the iron is ever kept down.

* * *

Why the Young Chaps Were Bashful at First

"Recruiting goes forward with undiminished vigor, and now that the young men who have been holding back are convinced that they will really be wanted, they are coming forward with good grace and undertaking quite cheerfully the sacrifices involved, which in some cases are really immense."—By Our British Correspondent.

* * *

An angel direct from above
(By way of Nebraska, my love)
Cried, "Others delight,
Like dogs, in a fight;
But, coo, coo, and coo; I'm a dove!"

Funny how iron can be all wrought up without getting fatigued!

* * *

"And yet," muses the editor of the Unionville, Mo., *Republican*, evidently a stout-hearted scribe and a dauntless—"and yet the democrats have the nerve to stand up and try to claim credit for whatever good times we may be enjoying. Not a line of industry can be pointed to, which unaffected by the war, that can be said to be thriving. On the contrary dozens of articles for sale by the farmer is cheaper today when he sells it than it was before the trouble in spite of the war. The place to get the actual conditions is just before the trouble broke out in Europe, but even then they had not by any means reached the bottom to which they were headed."

* * *

Efficiency! The Kaiser, between fights, sends his soldiers out behind the lines to collect large steel tonnages kindly donated by the enemy.

* * *

"The Aurora and Detroit method of excluding from works only naturalized Americans may help to diminish the danger arising from miscellaneous employment of foreigners," says a contemporary. One would fancy that this danger could be still further diminished by excluding everybody.

* * *

Oh, Woody, would it be worth while
To stop and try to reconcile
The dog-in-manger attitude
With which the seamen's law's imbued—
This "Yankee ships for Yankees" stuff—
With "brother nations" free trade fluff?
There must be some discrepancy:
At least, that's how it seems to we.

* * *

Life, Judge, Puck, and other intentionally funny publications please notice that tungsten, being now above $3,000 a ton, may be legitimately used instead of coal for the jewelry joke.

* * *

This talk about our being a race of landlubbers recalls the days when the British navy went gunning for "Yankee haymakers on a raft"—and found 'em!

* * *

Expecting the country to prosper normally without a tariff wall is on a par with requesting an oyster to make you a pearl after you have deprived him of his shell.

* * *

"Oh, little share of Bethlehem,
How high we see thee fly—"

* * *

Mrs. Noorich—"Henry, it isn't—it *can't* be true that after all my efforts to maintain our social position, you've went and bought some *common* stock!"

* * *

"Scrap" steel—shrapnel rounds.

* * *

As She Is Writ

The following item forms a part of the letter head of a Toledo "correspondence agency":

Special Stories of all Kinds Prepaired by Selected Corps Of Trained Writers.

* * *

A clever young founder named Trimble,
Who thought himself daring and nimble,
Tossed a bottle of beer
In the ladle. Oh, dear!
They laid him to rest in a thimble.

* * *

That German "Copper Famine"

An electric cable has been laid for industrial purposes between Helsingborg, in Sweden, and the opposite cost of Denmark, according to an American consular officer. It is capable of transmitting 40,000 volts, and was delivered by a German firm.

* * *

First La Follette Skipper. — I hear Jones lost his master's license.

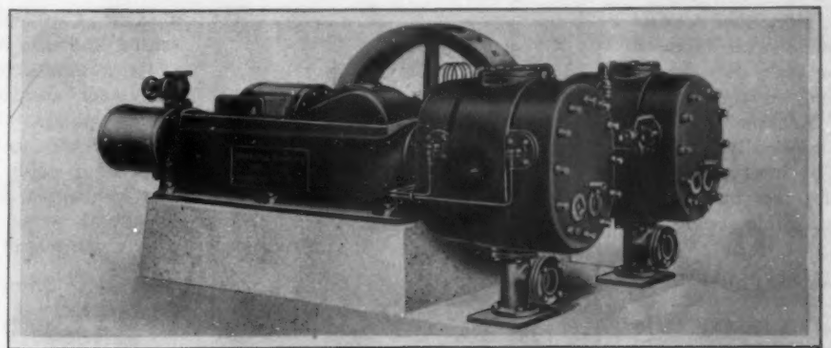
Second Ditto.—Yes, his crew complained to the inspectors about his splitting his infinitives.

* * *

A blast furnace foreman named Mac
Once climbed to the top of the stack
With a daredevil grin—
But he slipped and fell in;
And now he's a half-mile of track.

Design New Condenser Vacuum Pump

THE Ingersoll-Rand Co., New York, has developed a new vacuum pump for use in connection with condenser equipment, the details of which are shown in the accompanying illustrations. In general, the design of this pump follows that of the crank and flywheel type air compressors built by the Ingersoll-Rand Co. The vacuum cylinders, as shown in Fig. 2, are somewhat different from those ordinarily met with in that the intake valves are of the corliss type, so placed in the cylinder head that the clearance is exceptionally low. It is claimed that this is a desirable feature since the air trapped in the clearance spaces at discharge pressure will not reach such a volume, upon being expanded to intake pressure, as to greatly limit the pressure reduction which may be obtained by means of this pump. The discharge valves, which are of the direct lift poppet type, are placed in the bottom of the cylinder heads so that any entering moisture or water is immediately discharged, a feature that makes for safety in handling moist or saturated vapor. The clearance has been reduced at the point of discharge by making the valve partially fill the port in the cylinder head. The discharge passages are water-jacketed. The running gear, including the main frame with its enclosed reciprocating parts, the crank shaft, connecting rod, crosshead valve gear and wheel on both belt and steam driven machines, are of the same design as the air compressors referred to previously. Lubrication is by the bath system, the moving parts being flooded with oil. All parts are accessible.



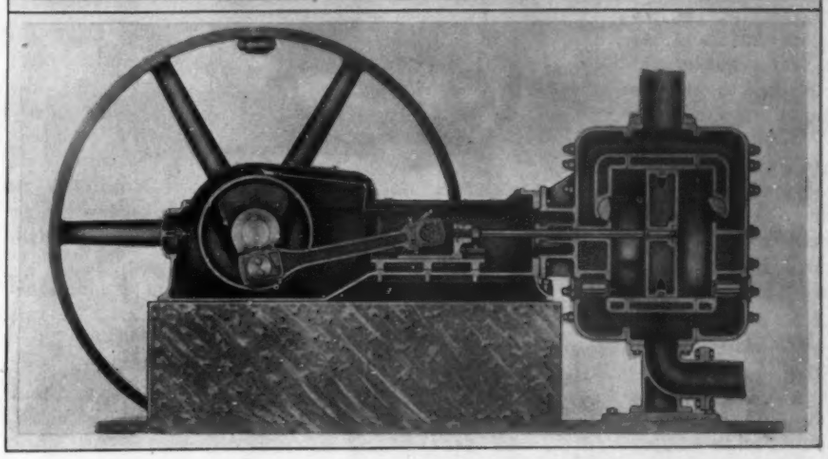


FIG. 1—EXTERIOR OF INGERSOLL-RAND VACUUM PUMP
FIG. 2—SECTIONAL VIEW OF VACUUM PUMP

Finding Flaws in Steel by Electricity

AN electrical device for the purpose of indicating differences in the homogeneity of metals of magnetic character, has been developed by Ethan I. Dodds, Pittsburgh. This apparatus is designed to record the locations of internal defects in iron and steel castings, rails, ingots and the like. Numerous tests of the method have been made at the plant of the Union Switch & Signal Co., Swissvale, Pa.

The device consists of two small horseshoe magnets. Each magnet has a primary winding, which is energized from the secondary coil of a transformer, the primary of which is energized by an alternating generator. The two primary windings of the magnets are connected in multiple. The secondary winding is connected with the terminals of two electromagnets of a sound producing device or buzzer. The two buzzer armatures are tuned so that in harmony with similar currents in the windings of the magnets, they will produce sounds of substantially the same character. Adjacent to each buzzer armature is a transmitter, similar to that of an ordinary telephone. A light magnetic current is induced through the product to be tested, the magnets being moved along its surface. As long as the metal adjacent to each magnet is of uniform character and density, approximately the same number of magnetic lines of force will pass between the two poles of each magnet, and sounds of corresponding character will be produced at the two sound producing instruments. It is pointed out that if there is a defect, such as a blow-hole or pipe, the magnetic field of the magnet will be weakened to such an extent that less current will be induced in the secondary winding, thereby causing the sound producing instrument connected with this winding to produce a sound of different character from that of the other instrument, thus enabling the operator to locate the defect. A patent is pending on a machine developed by Mr. Dodds to register the variations in the currents.

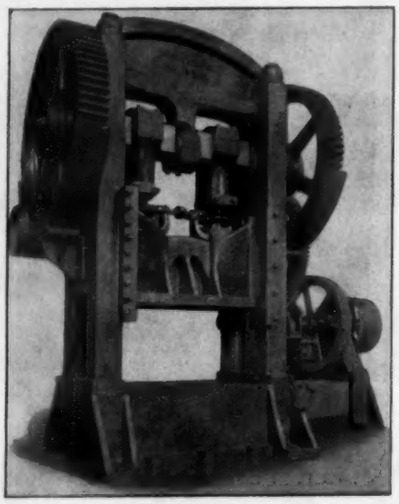
Mr. Dodds is consulting engineer for the Flannery Bolt Co., Pittsburgh, and was the founder of the American Flexible Bolt Co. At one time he was connected with the Carnegie Steel Co. and the Pullman Co. He has made a comprehensive study of methods for testing iron and steel products.

Press for Forming Automobile Parts

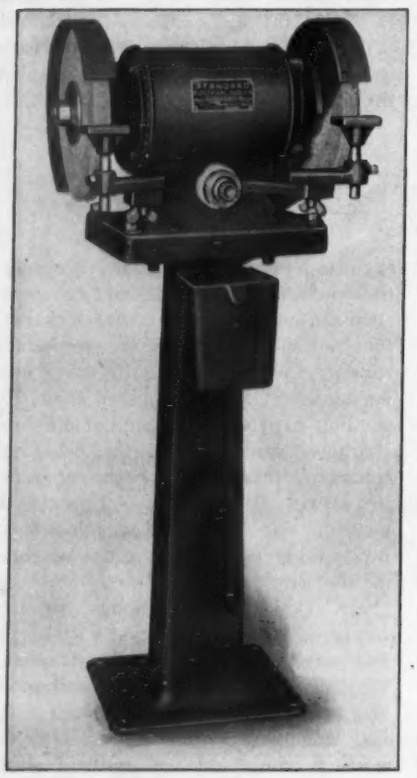
DESIGNED to meet the demand for larger capacity with increased safety, a new high duty power press recently placed on the market by the Cleveland Machine & Mfg. Co., Cleveland, is especially adapted to the production of heavy automobile parts. Its total weight is 83½ tons, the stroke of slide being 10 inches.

The distance from the bed to the slide with stroke down and adjustment up is 26 inches. The bed area of the machine is 72 inches from right to left and 48 inches from front to rear. The crankshaft diameter is 10 inches in the bearings and 11¼ inches on the crank pins.

The gearing is of steel throughout with machine-cut teeth, the gearing proportion being 45 to 1. A massive spring drawing attachment which may be mounted in the bed of the press is designed for the operation of in-and-out pads and draw or pressure rings. A friction clutch of the multiple disc type is used. The machine, which is adapted to the manufacture of automobile frame cross members and similar heavy forming, blanking and drawing operations, is shown in the accompanying illustration at the top of this page.



HEAVY FORMING PRESS



PEDESTAL GRINDING MACHINE

Pedestal and Aerial Grinder

Two interesting grinders have been recently placed on the market by the Standard Electric Tool Co., Cincinnati. One of these, a semi-portable pedestal type, which is shown in the illustration at the left, is made in a 1-horsepower size with a 10 x 1-inch wheel and a ½-horsepower size with an 8 x ¾-inch wheel. As shown in the illustration, the motor drive is thoroughly protected against dust. Ball bearings of the double-row, self-aligning type, which are used throughout, are encased in grease in dust-proof chambers. The motor is impregnated with a special high resistance composition. The grinder, which is said to be readily portable from one part of the factory to another where required, is wound for either alternating or direct current, such as is available at the usual lighting potentials.

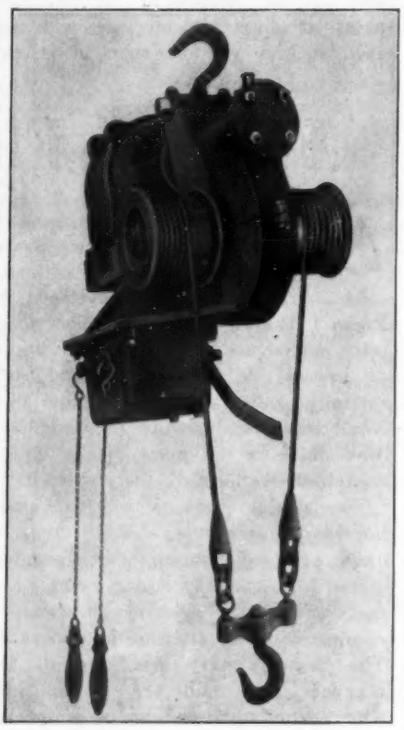
The other model is an aerial grinder also built in ½-horsepower size, for direct or alternating current of 110 or 220 volts pressure. The spring suspension of the tool permits of its use in places which would be practically inaccessible to the usual type of grinders. The design of this model, as well as the size of the wheels used, is similar to that of the pedestal grinder. Buffing, as well as grinding operations, it is said, may be performed with either tool.

The Jones Paint Co., Rome, N. Y., has recently issued a number of attractive booklets describing its products. Under the caption "A Feather in Our Cap" photographs are presented showing orders received, from a large number of the leading iron and steel companies, for the company's paints. Another interesting folder reproduces the sworn statement of a public accountant showing that in the last 10 years, 95 per cent of the buyers of the Jones company's paint have reordered.

Electric Hoist

The Dake Engine Co., Grand Haven, Mich., has just placed on the market the electric hoist, shown in the illustration below. The hoist is shown equipped with hook and wire rope wound on drums, but it also is furnished with a trolley to run on I-beams or channels and with chain and chain sprockets instead of rope.

The design permits the lower hook to be raised unusually close to the suspension point. A limit switch automatically stops the load at the highest point of travel. This hoist is said to be extremely simple to operate. It is furnished for use with either direct or alternating current, and with constant speed motor with switch or variable speed motor with control apparatus. The hoist is unusually compact and simple in construction.



NEW ELECTRIC HOIST

Data on Costs of Electric Steel

IN THIS article Mr. Snyder has outlined in a graphic manner the results obtained with tests of a single electrode furnace. He has eliminated overhead and supervision charges, the first being a personal variant independent of the type of furnace used and the second being negligible. "The labor cost," he declares, "is due primarily to the mechanical and electrical construction." Statistical data are given.

By F. T. Snyder

IT IS now widely known that steel of high quality can be made electrically. It is known to a considerable number of metallurgists that properly designed electric furnaces will operate reliably and regularly with a low percentage of lost time. It is convincingly known to only comparatively few makers of steel that electric steel can be made at a cost comparing favorably with the corresponding cost with fuel furnaces. These few naturally include the operators of the furnaces that are making such records.

To render this information more widely available, this paper gives the operating costs for two sizes of furnaces in common use and of a type designed by the writer. In each case the costs represent records extending over continuous commercial use for periods of from one and a half to two years. As these costs are markedly lower than records of similar character of earlier types of electric steel furnaces, some of the reasons are given why such lower records should be expected with this latter furnace design. The furnace from which these operating costs were obtained is of the standard Snyder type.

ELECTRIC FURNACE IN A STEEL FOUNDRY

The furnace consists of a circular shell lined with refractories. The current enters at the bottom of the crane and passes into the furnace by a single electrode in the center. The heat is generated in the arc by which the current jumps from the electrode to the slag covering the metal. The electric current leaves the furnace through a contact with the metal bath. Operating costs as given do not include supervision, as the amount involved is so small that no additional cost to the plants containing these furnaces resulted on account of such supervision. No overhead, due to cost and maintenance of buildings, is included in these costs, as the intention is to make these records of use to prospective users of such electric melting furnaces, and the building overhead cost varies widely from plant to plant, and is substantially independent of the sort of furnace used. The metal loss, due to spills and oxidation, is not included, as these depend largely on the care which is used by the melter.

In each of the furnaces from which these costs come, the metal loss has been substantially below 1 per cent of metallic contents of the charge. The costs for scrap used are real prices over long periods of time for special scrap material, and are due to the ability of these electric furnaces to handle low-priced material.

In comparing these operating costs with other published records, it should be kept in mind that these costs do not represent single heats, or runs made under test conditions, or under exceptional circumstances. They are the average of regular commercial operation during long continued industrial service. These costs include the stand-by losses between heats, the breakages and waste of supplies, the lost time on Sundays and holidays, the overtime work on maintenance. Considering the cost items in the reverse order from that in which they appear on the cost statement, the item of burden, which includes interest, depreciation and taxes, is due to the melting ability of these furnaces. Each of these furnaces has regularly made four heats in an 11-hour shift. This is about double the output for the size of furnace of that from furnaces of earlier design, and the burden item per ton of output is, therefore, correspondingly reduced.

The item of supplies is made up of electrodes and refractories. Each of these furnaces runs on less than four pounds of electrode per ton of steel poured, as compared with an average of 30 pounds for furnaces of earlier design. This large difference is due to the joint operation of several causes.

Most of the refractory wear in an electric furnace is on the roof. The sides are banked up with relatively cheap material that keeps the walls from

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wearing. This roof wear is largely around the electrodes and is partly due to the hot gases that escape between the electrode and the roof. With a single-electrode furnace, the arc is at the center at the maximum distance from the walls, with consequent low wall wear.

The refractories are at a temperature between the arc temperature and the temperature of the bath, as in an arc furnace about 50 per cent of the energy reaches the bath by reflection from the lining of the furnace. Therefore, a low arc temperature means a low refractory temperature. At steel melting temperatures even a few degrees' drop means a large extension of the life of the refractories.

The costs are as follows:

WHEN MELTING COLD SCRAP AT 10-TON OUTPUT

		Per day.	Per ton.
Output:			
Heats in 11 hours	....	4	....
Tons of metal 11 hrs.	....	10	....
Labor:			
Melter	$4.00	....	....
Helpers	2.50	....	....
		$6.50	$0.65
Electricity (per kilowatt hr. 0.7c):			
Furnace	$34.70	....	....
Substation	4.00	....	....
		38.70	3.87
Supplies:			
Refractories	$3.00	....	....
Electrodes	6.00	....	....
		9.00	.90
Maintenance:			
	....	2.40	.24
Direct cost	....	$56.60	$5.66
Burden:			
Int., deprec. and taxes	....	18.00	1.80
Conversion cost	....	$74.60	$7.46
Charge:			
Scrap	$110.00	....	....
Alloys	6.00	....	....
		116.00	11.60
Total cost melted metal	....	$190.60	$19.06

WHEN MELTING COLD SCRAP AT 6-TON OUTPUT

		Per day.	Per ton.
Output:			
Heats in 12 hours	....	4	....
Tons of metal 11 hrs.	....	6	....
Labor:			
Melter	$3.00	.....	....
Helpers	1.40	.....	....
		$4.40	$0.74
Electricity (per kilowatt hour 1.4c):			
Furnace	45.02	.....	....
Substation	1.84	.....	....
		46.86	7.81
Supplies:			
Refractories	1.70	.....	....
Electrodes	3.00	.....	....
		4.70	0.78
Maintenance:			
	....	.84	0.14
Direct cost	....	$56.80	$9.47
Burden:			
Int., deprec. and taxes	....	11.30	1.88
Conversion cost	....	$68.10	$11.35
Charge:			
Scrap	$58.00	.....	....
Alloys	2.04	.....	....
		60.04	10.01
Total cost of metal.	....	$128.14	$21.36

The electric heat used in an electric steel melting furnace is made up of two parts. One part goes into the metal and goes with the metal into the ladle. This part is a fixed amount per ton for a definite pouring temperature. It is the same for all steel melting furnaces, both fuel and electric. The other part represents the heat lost during the melting operation. It all appears in the heated air around the furnace or in the cooling water from the various jackets used. This heat is lost through the doors, the roof, the shell and the electrodes.

Snyder furnaces are fitted with a door in the form of a plug so that in place of the usual 4½ inches of door brick, they present the resistance of 14 inches of thickness to the flow of heat. Thorough tests of the sliding type of door usually used with earlier furnaces show a door loss exceeding 100 kilowatt-hours per ton of steel. Much of this is saved by this plug type of door. We have no experimental results on the actual heat losses with the plug type of door, but our calculations, based on its outside temperature, show probable heat losses of 3.3 kilowatts per furnace door.

The furnaces have roofs substantially 50 per cent thicker than those of earlier design. Special attention has been given to the design of the shell linings of these furnaces, which are made up of a series of concentric refractories, each proportioned for its specific part of the heat insulation work. They are designed for and operate with external surface temperatures at about 60 degrees Cent. It is practical to hold the hand against the outer surface of the shell of these furnaces. In actual practice the radiation losses are such that no extra means are used to keep them hot between heats. With furnaces of older design it was usual to keep current on at reduced input, or to use an oil burner during the off-shift when a furnace operates only one shift a day.

Electrode Loss

The principal unavoidable heat loss in an electric furnace is through the electrodes. Just as a copper wire conducts electricity better than air, so a carbon electrode conducts heat much better than would the air in an empty electrode hole.

A substantial loss of heat with the older designs is due to furnace delays. If the pouring gang are not ready to take the heat the moment it is finished, the high radiation losses of the furnaces of older design keep on and are frequently augmented by the melter allowing the temperature of the bath to keep on going up. The furnaces from which the records given here were taken are designed to regulate automatically for maximum temperature. As the temperature reaches that for which the furnaces were designed, the electric input is just sufficient to keep up the radiation. This reduces largely the loss of heat due to furnace delays. In addition, it prevents largely the overheating of refractories.

The labor cost with these furnaces is due primarily to the mechanical and electrical construction. The smaller of the furnaces is handled by a single man, except when charging, when three helpers are used to shorten the charging time. Due to the fact that the furnace is self-regulating, this single melter, for something over half his time, has nothing to do at the furnace. This extra time the single melter uses in making ready the next roof and in shearing up scrap for easy shoveling.

In closing, it may be stated that these furnaces show a thermal efficiency not far from double that usual with furnaces of older design. The most reliable figures we can get for regular operation of furnaces of older design operating on a single shift show about 1,000 kilowatt-hours per ton of steel, of which only 33 per cent goes into the ladle with the fluid steel and slag; modern furnaces under equivalent conditions use only about 560 kilowatt-hours per ton of steel, the corresponding efficiency being 63 per cent. This is important commercially.

The slow progress of electric steel making in the first 10 years of its commercial existence was due to its high costs. It could not compete with most types of fuel furnaces in cost per ton of output. Its plea for existence had to be based on quality of product. The advance in this country, where quality was relatively unimportant, was slow. The furnaces of newer design give costs that are as low as most types of fuel furnaces. Now that properly designed electric furnaces can compete in cost with fuel melting on steel, their introduction in this country should be accelerated.

Earl H. Browning, who for 15 years has been vice president and works manager of the Browning Engineering Co., Cleveland, manufacturer of locomotive cranes, wrecking cranes, railway ditchers, clam shell buckets and hoisting and conveying machinery, has resigned to accept the vice presidency of the The Machine Products Co., of Cleveland, which is a new organization formed to execute a large war order and eventually to build machine tools.

Iron and Money: Fact and Comment

Increased Railroad Earnings and Success in Financial Operations Are Important Factors

NEWS from the railroads was a rather important factor on Wall street last week. The refunding of a $60,000,000 loan by the Baltimore & Ohio and the sale of $10,000,000 of preferred stock by the Atchison were transactions showing how the railroads are getting in a position to take care of their finances.

The market was very quiet Monday. Baltimore & Ohio reported a gross gain of 25 per cent and a net increase of 60 per cent in October, when it carried over $2,000,000 more in gross traffic than in October last year. The railroad list of stocks, however, was not excited by the Baltimore & Ohio report. Bonds are firm nowadays and this firmness promises to be maintained for at least several months.

Dealing in stocks Tuesday amounted to less than 330,000 shares. Most of the war stocks were strong, but Bethlehem did not change hands.

Bethlehem Steel passed Wednesday without a sale large enough to make an official quotation. The inactivity was a feature of the market. The Texas Co. has become a very active stock and on Wednesday advanced over 20 points, reacting only 2. There was also much activity in the Standard Oil group.

Thursday was Thanksgiving day and Friday the principal news came from banking houses, rather than from the stock exchanges. The Baltimore & Ohio sold to bankers $60,000,000 refunding and general mortgage fives of which $40,000,000 will retire notes maturing in 1917 and 1918. It was announced that a banking syndicate is being formed to underwrite $20,000,000 cash requirements of the St. Louis & San Francisco system. Further attempts are being made by the British government to utilize American securities by putting them up as collateral rather than selling them.

The market was so dull Saturday that, owing to lack of a better explanation, the big foot ball game between the army and the navy was given as an excuse for the absence of numerous members of the exchange. The London market was cheerful and exchanges on Berlin dropped to the lowest figure since the war commenced.

Quotations at the close of business Nov. 27 and changes in the leading stocks identified with the iron and steel industry for the week are shown in the following table:

	Close Nov. 27.	Net chg.
American Can	63⅛	+5⅛
American Can, prfd.	111½	+3⅜
Amer. Car & Fdy. Co.	82⅛	+ ⅞
Amer. Car & Fdy. Co., prfd.	117⅛	....
American Locomotive	71	+1½
American Locomotive, prfd.	103⅞	+ ⅜
American Steel Foundries	61⅝	+ ⅞
Baldwin Locomotive	116	+3
Baldwin Locomotive, prfd.	112	+2
Bethlehem Steel, prfd.	161½	....
Colorado Fuel & Iron	52¼	+ ⅜
Continental Can	89⅜	+1⅛
Continental Can, prfd.	108	+1½
Crucible Steel	75	+1½
Crucible Steel, prfd.	111½	+3½
General Electric	177	+2
International Harv. of N. J.	110¼	+1¼
Lackawanna Steel	83½	+2½
Nat'l Enamel. & Stamp. Co.	29⅞	+1⅛
Pressed Steel Car	65½	—1¼
Pressed Steel Car, prfd.	105¼	+1
Pullman Palace Car	168	+1½
Republic Iron & Steel	51½	+ ⅝
Republic Iron & Steel, prfd.	109⅞	+1⅛
U. S. Cast Iron Pipe & Fdy.	26	— ⅜
U. S. C. I. P. & F. Co., prf.	53½	— ½
United States Steel	87¼	+ ⅛
United States Steel, prfd.	115⅞	....
Westinghouse Mfg.	69¾	+2¼

Replogle a Director

J. Leonard Replogle, vice president of the American Vanadium Co., who heads a syndicate which recently acquired about 300,000 shares of Cambria Steel stock, was elected a director of the company at a meeting at Philadelphia on Nov. 24. Arthur E. Newbold, a member of the firm of Drexel & Co., Philadelphia, bankers, and Herbert F. Black, of Pittsburgh, also were made directors. The three new directors take the places of Theodore N. Ely, Samuel T. Modine and Childs Frick. The retirement of Childs Frick, son of H. C. Frick, confirms the report of the retirement of the latter as a prominent shareholder of Cambria Steel. It is learned from authoritative sources that Mr. Frick, who has been the largest individual stockholder, apart from the Pennsylvania railroad, has been disposing of his shares during the past two months. Effingham B. Morris, who with Mr. Ely had represented the Pennsylvania railroad interests in the company, remains as chairman of the board, but it is understood his tenure of office will be short and that he has agreed to continue in that position only under persuasion while other plans are being formulated.

A new $6,000,000 company has been formed to acquire the Saxon Motor Co., of Detroit. The capital will be all common stock and there will be no bonded indebtedness. The stock is being offered for public subscription at $75 a share. Net earnings for the current year are given at $850,000 and a production of 17,000 cars. It is believed that 30,000 cars will be produced in 1916.

Cambria Holdings

Henry C. Frick is credited with holding 37,700 shares of Cambria Steel Co. in a recent listing of the stockholders of that company published in the *Wall Street Journal.* It is understood, however, that since this list was prepared Mr. Frick has disposed of the large part, if not all of his stock. Other large holders, according to the *Wall Street Journal* compilation, are William H. Donner, 12,500 shares; William Waldorf Astor, 10,293 shares; Henry & West, Philadelphia, 17,180 shares; R. T. Kennedy, 14,222 shares; P. A. B. Widener, 15,000 shares. Three members of the Replogle family held a total of 2,226 shares when the list was prepared.

Machinery Purchased

Trenton, N. J., Dec. 1. — Respecting the reported purchase of the Spencer Wire Rope Co., of Worcester, Mass., by the John A. Roebling's Sons Co., of this city, the following statement was made by Ferdinand W. Roebling, secretary-treasurer of the Roebling plant:

"The wire rope machinery of the Spencer Wire Rope Co., of Worcester, Mass., was purchased by the Durable Wire Rope Co., of Boston, a corporation controlled by us. The machinery will be operated by the Durable Wire Rope Co., using the wire shipped from Trenton. The output will be confined to the making of ordinary commercial wire rope used in this country."

The Aberthaw Construction Co., specialist in concrete, has removed its offices to more commodious quarters in the newly erected Niles building, 27 School street, Boston. In its new quarters, the company will be better equipped to handle the construction of industrial plants, dams and similar structures.

Henry Ford & Son is the name of the firm which will manufacture the Ford tractor in Dearborn. Five hundred men will be employed at the start. It will be a profit sharing operation.

Business News of Nation's Capital

Appropriations for Army and Navy and Means of Raising More Revenue Will Be Leading Subjects for Action by Congress

Washington, Nov. 30.—With everything in readiness for the convening of the sixty-fourth congress next Monday, there is great interest manifested in the program that will be laid before it, and the manner in which it is proposed to execute it. President Wilson is expected to touch principally, if not entirely, upon the question of national defense in the message he will read to congress on Tuesday, and this topic, of course, is uppermost in the mind of the country. Republicans are as earnest in their desire as is the President that it shall not be treated at a party issue, but want to be given as clear an understanding of the plan of national defense as the administration will suggest to Democratic leaders. That the President appreciates this fact and approves of it is held to be made plain by the conference he arranged with Minority Leader Gallinger of the senate and Minority Leader Mann of the house, both of whom accepted his invitation to go to the White House and discuss the question of national defense with him. Mr. Mann has said that he would participate in the conference, but would not "take orders from the White House", but there has been no evidence that the President had the slightest ideas of giving orders.

Tax on Munitions

In his statement, published last Friday, Secretary of the Treasury McAdoo suggested methods for raising additional revenue, not only to maintain ordinary government expenses, but also to provide for the national defense program, and it is believed his plan had the approval of the President before it was announced to the public. It carries suggestions that have been anticipated, but it is thought there are other recommendations to be made. Mr. McAdoo suggests lowering of the exemption in the income tax law and an advance of the rates, an extension of the war tax to gasoline, crude and refined oils, horsepower of automobiles and "other internal combustion engines", re-enactment of the war revenue tax in its present form, and retention of the present duty on sugar.

It is thought, however, additional recommendations will include, among others, a tax on the manufacture of war munitions, a question which will involve much discussion. The matter of defining what constitutes war munitions will be a big task in itself. Inasmuch as makers of war munitions are already paying an income tax, which increases with every ton of additional materials produced, it means that to place an excise tax on the industry would result in double taxation. Moreover, it is an uncertain tax, because the industry depends upon the length of the war, as well as the chance of a decline in demand. England and France are said to be building added capacity for the manufacturing of war munitions and it may reach such a proportion as to depress greatly the industry in this country. The essence of the revenue raising program appears to be in taxing wealth, and an inheritance tax is known to be under consideration by some Democratic leaders. It is thought to be certain that beyond the retention of the present duty on sugar, nothing will be done in the way of tariff legislation, unless an anti-dumping clause be enacted. Secretary McAdoo's opposition to an issuance of Panama canal bonds apparently represents the attitude of the President on this question.

Even if the President himself does not advert to the plan in his message, it is not unlikely that the national defense program will provide in some way for mobilization of industries of the country. Taking note of lessons taught so far by the European war, the war and navy departments have obtained data as to the output of war munition plants and suggestions for maintaining part of the capacity, if not all of it, or to restore the present capacity on short notice, may be made. In this direction, significance has been attached to to an address recently delivered before the Washington Society of Engineers by W. L. Saunders, New York, a member of the naval advisory board, and one of the recognized leading engineers of the country. In his address, he compared the industrial efficiency and strength of various nations and showed that the United States is admirably organized industrially on a peace basis, but totally unorganized for war in an industrial sense.

The suggestion has been made heretofore by *The Iron Trade Review* that the government ship purchase bill will be revamped and reintroduced as a part of the national defense program. Whether the President will mention this measure as his proposed merchant marine and naval auxiliary legislation remains to be seen, but Senator Fletcher, ranking member of the committee on commerce, who had charge of the ship purchase bill at the sixty-third congress, said plainly not long ago that he thought it might be a good plan to provide for merchant marine in connection with the naval appropriation bill. In support of this he said that many of the Republican senators were in favor of building up the auxiliary force of the navy, and that they might be willing to support such a measure when they would oppose a straight-out government ship purchase bill, such as that before congress at the last session. Senator Fletcher is believed to have expressed a wish that is father of the thought. Contrary to his idea, it is said that the Republicans in both houses of congress will continue to bitterly oppose the measure, and, in addition, charge that the administration is making a partisan issue out of the national defense program, a contingency that would imperil the latter, for it seems to be a foregone conclusion that Republican aid is absolutely necessary to get the national defense program through. The President is facing a fight, which may assume formidable proportions, within his own party on this program. House Majority Leader Kitchin, for one, has said he would not support the program. Organized labor may also attempt to hyphenate the naval, army and fortification appropriation bills by tacking on riders abolishing scientific shop management in government navy yards and arsenals. Riders of this kind were successfully placed in the naval and army bills at the last session.

Expect Lively Session

Caucuses will be held this week by both parties to organize committees and make plans for the sixty-fourth congress. The legislative situation will then assume a more definite form. Republicans are watching the Democrats to see whether they pass upon the President's national defense program and say if this is done, plans for an enlarged army and navy will

be practically emasculated. In fact, viewed from any point, it is evident the sixty-fourth will be a congress full of fight of the most lively sort. The Democrats will have extremely difficult sledding in the house when the Republicans oppose them, it is pointed out, if there is a tendency of split among the Democrats, because they will have a majority of only 25. In the senate, there will be 56 Democrats and 40 Republicans.

Steel for Battleships

Washington, Nov. 30.—Bids to be opened at the bureau of supplies and accounts, navy department, next Friday morning at 10 o'clock for structural steel for battleships 43 and 44 call for approximately 32,175 tons of plates, shapes, bars and rivets. It will mark the first time in the history of the department that direct contracts have been sought by the navy department for this class of material for battleship construction. In the past, structural material for battleships was obtained by the Brooklyn navy yard, which obtained estimates from steel producers.

Secretary of the Navy Josephus Daniels, however, claiming that bids of private yards for construction of the vessels exceeded the limit of $7,800,000 set by the last congress, and that the bids of the Brooklyn, Philadelphia and Mare Island, Cal., were below the limit, said he was compelled to resort to the new scheme of bidding. It is his intention, he said, to ask congress to provide funds to enlarge the ways at the Philadelphia and Mare Island yards so that they can build the two vessels. The secretary has said that he feels sure congress will make the necessary appropriation, involving about $200,000 for the Philadelphia yard and a high figure, not accurately estimated, for the Mare Island yard. In the event congress does not do so, Secretary Danields said, he saw no way out of the dilemma other than the raising by congress of the limit it set for the cost of constructing the vessels. He added that, while he is in favor of enlarging navy yards, those at Mare Island, Philadelphia and Norfolk, so that they can build battleships, he also would like, whenever possible, to give contracts to private yards.

The secretary feels that his new plan of obtaining bids for the structural material will expedite delivery. The specifications sent out to steelmakers call for delivery, f. o. b. contractors' works, within 24 months following the date of contract, each delivery to be made within a period not to exceed 90 days after the detailed schedule has reached the bidders. The principal tonnages are as follows: 12,780 tons of medium steel plates, ranging from 5 to 70 pounds per square foot; 4,850 tons of nickel steel, ranging from 12½ to 70 pounds; 800 tons of high tensile steel plates, 5 per cent to be sketch plates; 4,996 tons of medium steel angles, size up to 8 inches on each plate and length up to 66 feet; 1,500 tons of medium steel ship chanels, 4 to 12 inches, and length up to 60 feet; 224 tons of medium steel flat bars, ¾ x ¼-inch, up to limits of universal mill; 4,992 tons of special treatment plates, about 20 per cent sketch, 40 to 200 pounds per square foot, and 1,797 hull rivets.

Detailed schedules for the 12,780 tons of medium steel plates will be forwarded to contractors within six months after the date of awards for 3,000 tons and at the rate of 1,000 tons per month thereafter for eight months, followed by small amounts to the end of the contract period.

Secretary Daniels proposes to have the small castings for the two ships built at the Brooklyn navy yard. Last Friday he directed the re-opening of the steel foundry there, which has been shut down for some years. He said he took this action on account of the extraordinary rise in prices of steel castings and the likelihood of serious delays in receiving them at any price.

No Undue Burdens

Washington, Nov. 30. — Authority granted the federal trade commission by congress to require regular or special reports from corporations will not be exercised to the extent of placing undue burdens upon business, according to plans just made by the commission. The subject has been gone over carefully and the commission has prescribed a course it proposes to pursue, intending to give back to industries something valuable for reports that may be ordered from them. The commission intends that, if by means of reports, it can show an industry that it is given to the practice of over-production, or if its costs are higher than they should be, it will call for them.

Inquiry made of Commissioner William H. Parry, who has given particular study to the situation, today revealed the ideas which have been concurred in by his colleagues. His observations were made in connection with a discussion as to whether the commission should establish a division of corporation reports. Mr. Parry said frankly that if he thought the proposed division would be reduced to a bureau aimed to collect dry statistics only, he would oppose its creation. It was made plain that the commission will not require annual reports such as are called for by the interstate commerce commission from the railroads. One reason for the action of the federal trade commission is that many corporations are now required to make reports to the state, the municipality and to various branches of the federal government. It appears to be the intention of the commission not to ask data of industries which are already required to make such reports, for to do so would be a mere duplication of statistics and result in undue annoyance, without accomplishing any good.

New Ordnance Company

The Bridgeport Forge & Projectile Co., Bridgeport, Ct., has been incorporated under the laws of that state with a capital stock of $10,000,000 for "the manufacture, construction, building, assembling and buying and selling of all kinds and description of ordnance, ammunition, machinery, tools and parts thereof, and the buying and selling of the raw materials from which the same are manufactured, constructed, built and assembled". The company will issue 1,000,000 shares of common stock of a par value at $10 each. The incorporators are, Judge Carl Foster, Frederick E. Morgan and Daniel J. Morgan, all of Bridgeport. The company is a separate organization from the Bridgeport Projectile Co., though the same interests are behind both corporations. The incorporators are but temporary officers, two of them being lawyers and the real men behind the company will not be disclosed until a permanent organization is effected.

W. H. Knight is president of the Bridgeport Projectile Co., and he has this to say regarding it: "We have built the largest plant in America for exclusive purpose of manufacturing light field artillery shells of all descriptions, and we shall soon be turning out shells at the rate of 10,000 a day to begin with. A majority of the company's $2,000,000 stock is held in Bridgeport."

Announcement is made that the plant of the Diamond State Steel Co., Wilmington, Del., undergoing rehabilitation, will resume operations about Jan. 1. The plant is expected to be a producer of munition steel. It has been idle for a number of years.

The two plants of the Prime Steel Co., Milwaukee, Wis., which were bought some time ago at bankruptcy sale by Harris Bros., of Chicago, are being dismantled and stock and equipment sold piecemeal.

News of Employers and Employes

Busy Detroit's Prosperity Not Bloated—Emma Goldman's Wild Talk—An Analyses of Business

EMMA GOLDMAN, goddess of anarchism, a one time dangerous agitator and claiming to be a student of sociology, was in Detroit recently on a lecture tour.

Here is a warning she sounded:

"Detroit capitalists are gorged to excess—bloated with prosperity—and Detroit labor is enjoying such a temporarily rich harvest that, like the Bacchanalians of old, they are forgetting their teachings and warnings and are likely to burst like a bubble, or over-inflated balloon."

This is as good a lead as any to a prosperity story. When a safe, sane and thoughtful person like Miss Goldman distributes a warning to Detroit's careless business men and Detroit's laborers, skilled and otherwise, it is time to take a recapitulation. Going through the various branches of activity in Michigan's wonder city, so-called, we found:

Automobile manufacturers running overtime in an effort to keep pace with orders; the automobile accessory concerns working at a stiffer pace than they have shown in recent years; stove producers working, in some cases, with nearly double the forces they were able to show at this time in 1914; copper and brass rolling mills running especially strong; alkali and salt concerns running much heavier than in a number of seasons; pill makers developing new markets.

Listed in the above paragraph is nearly every branch of the city's activity.

Taking them up in the order named:

Motor car manufacturers predict that the demand will continue strong through the season of 1916, although they do admit that the proposed tax on automobiles as well as the advancing price of gasoline will have some effect in curtailing the trade.

The Paige company, which is one of the wonders of the motor industry, will, it is understood, declare another 100 per cent stock dividend. This will be the second of the 100 per cent dividends within a short time. The stock is now paying five per cent a month in cash dividends. Prior to the last stock dividend of 100 per cent, which increased the capital from $250,000 to $500,000, it was paying 10 per cent a month in cash. The capital will now be increased from $500,000 to $1,000,000, it is reported, by taking money from the tremendous surplus the corporation has accumulated.

Three years ago, the Paige company was but a small concern among Detroit motor car producers. But, of a sudden, it seemed, the demand for its product increased to immense proportions. A new factory was built in the western part of the city and it was thought that this plant would meet the demand. But plans were incomplete. A short time ago, the concern began the erection of an addition that has practically doubled the output.

The Packard, Cadillac, Studebaker, Chalmers, Hudson, Ford, Hupmobile, Dodge, Maxwell and other plants are running strong. The Packard company reports a particularly heavy demand for trucks, while the Chalmers company, at a recent meeting of its salesmen, sold its entire output for 1916. The Ford plant in Detroit, and the branch concern in Walkerville, are working heavy. The Canadian factory plans a production of 40,000 cars this season and this means working at capacity through the year.

Automobile accessory concerns such as the Timken-Detroit Axle Co., Northway Motor Co., Continental Motor Co., Metal Products Co., and half a hundred other concerns are running behind orders and there is little chance of catching up.

The Detroit, Peninsular and Michigan Stove companies are running over their 1914 orders and the putting on workmen quite as fast as applications are made. Officials of these plants declare that prospects are very encouraging and that business will likely continue in heavy volume through the succeeding months.

The city's two principal copper and brass rolling mills—the Detroit and Michigan plants—are running heavy on orders that have been piling up for several months. Their output has had much to do with the present freight congestion in Detroit railroad yards, a congestion that has forced one transportation company—the Grand Trunk—to declare an embargo on several classes, included in which is iron ore.

Foundries in Detroit and suburban cities report one of the best business seasons of years and the officials expect no cessation for some time.

In Flint, the Buick, Chevrolet, Mason Motor Co., Weston Mott, Walker-Weiss Axle Co., and other concerns are on the high tide of prosperity. Statistics show that on Nov. 1 there were employed in the leading factories of the city 13,701 persons and the previous high record was attained in June, 1910, when 12,127 persons were on the payrolls of the various institutions. May 1 of 1915 there were 7,412 persons employed in 14 Flint factories and last year, in October, the total was 9,870. The Buick company with a payroll of 6,996, shows the heaviest outlay.

In Lansing the Reo and Oldsmobile companies are running strong and the Reo is doing a particularly heavy business in trucks.

The Michigan Builders' association held its third annual meeting in Muskegon recently and it was shown at this session that contractors in all lines were so rushed it was impossible for them to keep up with the demands. The Detroit exchange announced that the buildings going up in that city could not be estimated as to numbers and so many new and large contracts had been let that outside contractors were coming in to help build up the greatest city population in the state. The Grand Rapids exchange reported similar conditions while in Lansing contractors have not been able to get enough workmen. Flint has the reputation as the fastest growing city in the state while Kalamazoo reports a building boom.

The persons who brought Miss Goldman to Detroit lost money on the venture. Even the newspapers gave her but scant mention.

But she insisted ours was a bloated prosperity.

Finding of State Board

The Massachusetts state board of conciliation and arbitration has made public its findings in an investigation conducted in Worcester, Mass., to determine the responsibility for the discharge of employes of the Norton Grinding Co., of that city which, briefly are that the company is held responsible. The board finds "that the employes were justified in believing that the employer opposed membership in a union by persons in its employ; that its statements to them on Sept. 25, the subsequent discharge or suspension of others on or about Oct. 1, and locking out in excess of 300 more on Oct. 9, were endeavors

on its part to discourage employes from joining the union". The findings also declare "that the employes are justified in believing that the system maintained by the Worcester branch, National Metal Trades Association, and the employers holding membership therein relative to matters of employment, provides the opportunity for the maintenance of a blacklist".

Blames the Board

The Worcester, Mass., branch, National Metal Trades Association, in a public statement regarding the machinists' strike in that city, severely arraigns the Massachusetts state board of conciliation and arbitration for its attitude and says it is partly to blame for existing conditions. To quote its own words: "The responsibility for workmen remaining in idleness or away from their Worcester homes, and who have expressed to us the desire and necessity of going to work, rests partly upon those members of the state board of conciliation and arbitration who are trying to unionize all trades in Massachusetts through trade agreements, and partly upon our city officials who have for nine weeks permitted open intimidation to an unwarranted degree."

Other pertinent paragraphs in the statement are:

"We resent the imputation of the state board of conciliation and arbitration that our members have ever assumed to deny the right of workmen to organize. We also protest that we have not challenged certain laws by our efforts to discourage men from participating in the efforts of the International Association of Machinists. The latter organization seeks to shorten the hours of labor, restrict output and raise wages beyond all economic reason and to fasten upon the industries of Worcester the closed shop and upon every independent workman or citizen the certainty of being called a 'scab'.

"The state board has 'found the employers blameworthy for the continuance of the strikes' on the principle that a man is blameworthy who in order to avoid trouble or please some third party, refuses to give even a part of his purse to the highwayman who asks for it.

"As to the alleged blacklist referred to by the state board in its recent report concerning the Norton Grinding Co., the National Metal Trades Association maintains no blacklist, as was shown when the board was here, and its statement that 'the employes were justified in believing the employers had an opportunity to maintain a blacklist' is not only pernicious but silly."

New England Labor Troubles

The Massachusetts state board of conciliation and arbitration, which recently gave a hearing on the matter of the joint appplication for arbitration of a controversy between the Hendee Mfg. Co., Springfield, and its employes relative to the straight 8-hour day, has notified both parties that the board awards that there shall be no change in the schedule of working hours. This means that the company will continue to operate a 48-hour weekly schedule on the basis of eight hours and 45 minutes for five days of the week and four hours and 45 minutes on Saturday.

An increase in wages amounting to $300,000 annually has been granted by the United States Cartridge Co., Lowell, Mass., to its 5,000 employes there. The increase was recommended by the Massachusetts state board of conciliation and arbitration, which investigated labor troubles at the plant. The company announces that it will abide by the board's recommendations and that the new scale of wages will date from Sept. 28 last.

Approximately 800 of the 1,500 striking employes of the New Haven Clock Co., New Haven, Ct., have applied for reinstatement. While 120 machinists have voted to remain out, from the point of view of all the other strikers, the strike has been broken.

John A. Moffatt of the United States department of labor at Washington, who was successful in bringing about a settlement of a strike in New Haven, Ct., a short time ago, has gone to Meriden, Ct., to endeavor to bring about a conference between the strikers and the officials of the International Silver Co., where a strike affecting several thousand employes has existed a number of weeks.

Between 50 and 60 strikers of the Pratt & Whitney Co., Hartford, Ct., have returned to work. The exact number cannot be ascertained because the company has no figures distinguishing strikers from other men whom it has hired to take the strikers' places. For the same reason, the number of men who have returned since the strike began cannot be ascertained.

Twenty-five strikers of the Arrow Electric Co., Hartford, Ct., have also returned to work. The company now has about 375 people on its payroll and this number is about normal.

The working force at the factory of the Hart & Hegeman Co., Hartford, Ct., is up to normal, according to an official of the company. He said that the strike is no longer a factor in the business of the company and that it has ceased to think about it.

William T. Thuer, chairman of the Pratt & Whitney Co., Hartford, Ct., strike committee, says that the fact that 48 of the strikers had voted to return to work does not end the strike at the plant. Another feature of the return of the machinists is that eight of their leaders have, by their action, automatically suspended themselves from the union and will be considered and treated as strikebreakers by their former brothers.

No More Smokes

Norton Co., and Norton Grinding Co., Worcester, Mass., have issued orders to their 1,500 employes prohibiting smoking throughout all of its buildings, grounds and offices, days, nights and Sundays. The reason given is that on account of the many destructive fires which have already occurred in busy plants they deem it wise to exercise every precaution. To accommodate those wishing to smoke, it will be permitted between 12 and 1 o'clock daily in the assembly hall of the administration building. This is where about 200 women clerks pass their noon hour and they are likely to make a protest.

Starts Three Furnaces

During the past two weeks, the Snyder Electric Furnace Co., Chicago, has started three basic furnaces at the plants of the Gerlinger Steel Casting Co., Milwaukee; Halcomb Steel Co., Syracuse, and Dayton Steel Foundry Co., Dayton, O. The Gerlinger furnace is the same type and size as those which were started during September in the plants of the Niagara Electric Steel Corporation, North Tonawanda, New York, and S. Fair & Son, Inc., Saginaw, Mich. It has a 24-hour capacity of six tons. The Halcomb furnace has a 24-hour capacity of 30 tons and the Dayton furnace has a capacity of 10 tons.

Metal from the first heat of the Gerlinger furnace showed a tensile strength of 72,000 pounds unannealed and 120,000 pounds annealed with an elongation of 20 per cent in 2 inches. The carbon content was 45 per cent. The Halcomb furnace poured good tool steel ingots on the very first heat and is satisfactorily operating as designed and guaranteed.

The Steel Co. of Canada is doubling its capacity at Hamilton, Ont. Earnings of the company are establishing new high records.

Iron Made

By the Minnesota Steel Co.—Will Soon Be Pouring Steel

Operations have been inaugurated at the new steel plant of the Minnesota Steel Co., at Duluth, by the blowing in of the first blast furnace. The open hearth works, it is expected, will begin steelmaking within the next two or three weeks and the intermediate and finishing mills then will be started. The second blast furnace will be started shortly. The works of the Minnesota Steel Co., which is the latest addition to the Steel Corporation's plants, consists of two 500-ton blast furnaces, 90 Koppers coke ovens, 10 75-ton open hearth furnaces, a 40-inch blooming mill, a 28-inch and 18-inch combination rail structural and heavy bar mill, a 16-inch continuous roughing train and 8, 10 and 12-inch merchant mills. In addition, there is a by-product plant for the manufacture of ammonium sulphate. Provision has been made for later installation of four additional open hearth furnaces. The new plant will add about 500,000 tons of steel ingots and 350,000 tons of finished product annually to the output of the Steel Corporation. Preliminary work on the Minnesota Steel Co. works was begun in 1907, but little progress had been made until 1910.

Two New Open Hearths

Another steel works extension for the Chicago district is announced and will consist of two 60-ton open hearth furnaces for the East Chicago works of the Interstate Iron & Steel Co. Contracts for the construction of this extension have been awarded. The Lackawanna Steel Co. will furnish and erect the fabricated material.

Making Ferro-Tungsten in U. S. A.

The Pittsburgh industrial development commission has decided to ask congress to afford protection for industries in the Greater Pittsburgh district, which have been developed since the outbreak of the European war. One of the most recent industrial developments in the Pittsburgh district has been the application of a process of manufacturing ferro-tungsten, an alloy which enters into the manufacture of high speed tool steel. The bulk of the ferro-tungsten used in the manufacture of tool steel came from Germany until that country was isolated by the war.

The industrial development commission says there are three producers of ferro-tungsten in this country. R. L. Sessions, a metallurgist connected with the Vanadium-Alloys Steel Co., Pittsburgh, with works at Latrobe, Pa., perfected a process for the manufacture of ferro-tungsten shortly after nearly all of civilized Europe became involved in the European war. The company owns ore mines near Boulder, Col. The company is offering ferro-tungsten ranging from 70 to 80 per cent in tungsten.

For Long Time

Prosperity Will Continue, Said Schwab at Pittsburgh

Charles M. Schwab, president of the Bethlehem Steel Corporation, in an address at Pittsburgh last week, expressed the opinion that the country has entered a period of prosperity which in duration will be commensurate with the period of depression through which we have recently passed. Mr. Schwab, whose address was delivered before the chamber of commerce, made a strong appeal for establishing a merchant marine. He said he was indifferent as to the plan for rehabilitating the merchant marine and he did not care whether some people profited unduly or not, because he was convinced that the establishment of an American merchant marine to handle American products in the markets of the world would work to the ultimate benefit of the American people at large. He opposed paying tolls on the Panama canal for ships flying the American flag.

Mr. Schwab, accompanied by Mrs. Schwab, went to Pittsburgh to attend the festivities of the Carnegie Institute of Technology, connected with the celebration of Andrew Carnegie's eightieth birthday and the fifteenth anniversary of the founding of the Institute.

Many tributes to Andrew Carnegie were paid by speakers attending the exercises in honor of Mr. Carnegie's eightieth anniversary. Dr. Henry Smith Prichett, president of the Carnegie Foundation, said Mr. Carnegie has given away nearly $400,000,000 for the advancement of practical education.

The Youngstown Sheet & Tube Co. has placed a contract with the Robins Belt Conveying Co., Passaic, N. J., for coal handling equipment for the new by-product coke plant. The company will install a plant for the reduction of benzol and other by-products, contracts for which have been awarded the Semet-Solvay Co., Syracuse, N. Y.

Plant in Canada

To Make Heavy Ordnance Will Not Be Established

Toronto, Canada, Dec. 1.—Word has been received at Ottawa that the Imperial government has decided not to proceed with the establishment of a Canadian plant for the manufacture of heavy ordnance at present. The project was reported on favorably by Sir Frederick Donaldson and Gen. Mahon after an inspection of the steel plants in Eastern Canada and an investigation into the resources available for the purpose. The reason for the adverse decision of the British government is not known, but it is surmised that the question of time may have been one of the chief considerations, as no delivery of the output could be expected before six months. The exorbitant prices at first charged for shells by Canadian manufacturers, may also have been a deterring influence.

The Dominion Steel Corporation, having decided not to undertake the manufacture of shells owing to the heavy outlay required, is devoting special attention to the production of shell steel. Heavy orders for munitions from Russia are stated to be available, provided the Canadian plants can guarantee deliveries on time.

The Zimmerman Steel Co., Lone Tree, Ia., announces that it has moved its business to Bettendorf, Ia., where it has a new and up-to-date steel plant. The buildings are fireproof and adjoin Davenport on the east, almost in the heart of the cities of Davenport, Rock Island, Moline and East Moline. William C. F. Zimmerman is president of the company.

The Buffalo Contractors' Plant Corporation, Buffalo, has been incorporated with $150,000 capital stock for manufacturing hoisting machines and other equipment used by contractors. The directors of the company are George M. and Fred B. Misner, both of Buffalo; Charles Riordan, St. Catherines; W. L. and W. M. Misner, both of Elma, N. Y.

Announcement has been made of the purchase of the Mount Union Silica Brick Co., of Mount Union, Pa., by William C. Sproul, of Chester, president of the General Refractories Co. The Mount Union Silica Brick Co. is one of the largest independent manufacturers of silica bricks and shapes in the country and has been owned by the estate of the late Scott Dibert, of Johnstown, Pa.

New Licenses

Are Granted for Installation of Heroult Furnaces

Shipments of complete Heroult electric steelmaking furnaces now are being made by the Pencoyd, Pa., works of the American Bridge Co., where, as announced previously in *The Iron Trade Review*, these units now are being constructed for various companies, as licenses for their installation are granted by the United States Steel Corporation, which controls the furnace patents in this country. Heretofore, the licensees have been contracting with various manufacturers for the construction and equipping of these furnaces, which has entailed more or less difficulty. The American Bridge Co. now has arranged to build, equip with electrical apparatus and install these furnaces complete in sizes up to 15 tons. The Pencoyd plant is fitted to furnish all the brass, iron and steel castings required as well as the structural steel. At present, one furnace has been built and installed by the company, two others have been shipped and another is in a completed stage.

A number of new licenses for Heroult furnaces have been granted, bringing the total to 35 in the United States and three in Canada, of which 19 are for making castings and the others for high grade steel ingots. The National Malleable Castings Co. will install two 6-ton units at its Grant works in Chicago to use hot metal. The company now has a 6-ton furnace at Sharon. The Carbon Steel Co., Pittsburgh, has been granted a license for a 6-ton; the Universal Rolling Mill, Bridgeville, Pa., for a 6-ton; the Alabama Power Co., Anniston, Ala., for a 6-ton; the Crucible Steel Casting Co., Cleveland, for a 1-ton; the Monarch Foundry Co., Stockton, Cal., for a 1-ton and the Electric Steel & Metals Co., Ltd., Welland, Ont., for a 6-ton, which will be the second unit of this size.

Profit Sharing Report

The National Civic Federation is about to publish the results of its investigation of the subject of profit sharing between employer and employe. The report will contain an analysis of over 100 plans now in operation in this country as well as a description of many abandoned ones and the causes of their failure. There will be set forth the views of employers and the attitude of labor unions. It will be ready for distribution about Dec. 5. Every employer of labor will, doubtless, be interested to learn of the different methods employed in industrial enterprises—manufacturing plants, mercantile houses, public service corporations and financial institutions.

Advance orders are being taken. A discount of 25 per cent will be made on orders for ten or more copies. The price is $2.00 per copy. The federation requests that orders be sent at once to Louis A. Coolidge, chairman welfare department, 33rd floor, Metropolitan tower, New York.

Must Be Naturalized

Chicago, Nov. 30.—The Moline Manufacturers Association at Moline, Ill., is insisting all foreigners working in its factories shall be naturalized. This has caused a rush to take out first papers in Moline.

War conditions have taught employers several lessons and they are taking steps to prevent dangers of several sorts which might disorganize their forces. The Moline employers have not gone as far as some in Detroit who insist that all employes shall be able to speak the English language.

Use Diesel Engine

An interesting power installation at the Panama-Pacific Exposition, San Francisco, is a 500-horsepower Busch Sulzer diesel crude oil engine in the machinery palace. The engine is direct connected to a 250-volt, 325-kilowatt, commutating-pole, direct current generator, manufactured by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Electric current is supplied to other exhibitors. It is said that the cost of operating the plant is less than 68 cents per hour for fuel and lubricating oil.

Triple Convention

A triple convention of the American Supply and Machinery Manufacturers' Association, the Southern Supply and Machinery Dealers' Association and the National Supply and Machinery Dealers' Association will be held in Pittsburgh on May 10, 11 and 12, 1916. The headquarters for the three associations will be the William Penn hotel, now in process of construction.

A meter repairer was soldering a meter and the solder came in contact with some water, causing it to "pop" into his eye. As moisture is likely to be present in meter seams, goggles are suggested for use while doing this kind of work.

American Steel

Takes Place of German in Making Flying Machines

New York, Nov. 30. — Steel for crank shafts and other motor parts now is being made in this country which is equal, if not superior, to the best product of the Krupp Works in Germany, according to a report made last week by a committee of the Aero Club of America. When the war broke out, motor manufacturers here found themselves in an embarrassing position, due to the decision of the German government not to permit any further exports of steel by the Krupp Works. Up to that time, the best steel for the manufacture of aviation motors had to be obtained from Germany, since the product of American steelmakers was of uncertain quality; the German makers, also were able to offer much lower prices by reason of the subsidies paid them by the German government. With the change in conditions due to the war, however, the steelmakers, in response to urgent demand, began experiments which have proved so successful that at least six mills now are able to turn out steel for this purpose which shows better results in actual tests than the German material. Large orders for this steel have been placed by all the aeroplane companies in this country. The committee also found that American magneto makers since the war began have improved their product until American magnetos, which formerly were inferior to German magnetos, now are as good as any which ever came out of Germany. As a result of the improvement in steel-making and in the manufacture of magnetos, the committee states, aviation motor makers at last are independent of Germany in every way.

The bureau of mines, department of the interior, has issued an interesting pamphlet entitled "The Buying and Selling of Ores and Metallurgical Products", by Charles H. Fulton. The pamphlet covers the methods of buying, sampling and selling ores of copper, lead, zinc and other non-ferrous metals and also includes interesting data on the methods of marketing the metals themselves.

The installation of electric drive in steel mills is interestingly described in a leaflet just issued by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. A chart is shown indicating the growth of this form of power in steel mills throughout the country.

Railroads Again Enter Tool Market

Munition Makers Buy Heavily But Transportation Companies Lead Demand—Ship Building Interests Make Additional Purchases—Ship Yard Planned in East

THE machine tool market continues to be characterized by great activity. Foreign demand, although not of the previous record proportions, is brisk. Foreign buyers continue to scour the market for lathes for the earliest delivery possible. Included in the business booked for export shipment last week, were several good-sized lots of shrapnel-size lathes, which will be shipped within the next two or three months. No particularly large purchases on the part of domestic munition makers are noted but good orders came from a number of these concerns. The Bethlehem Steel Co., which has been practically a continuous buyer since the outbreak of the war, now has begun to purchase machinery for replacement of that damaged by fire in its No. 4 machine shop. The Poole Engineering Co., Woodberry, Md., with office at 50 Church street, New York, which now is engaged in turning out a large munition contract, is figuring on two other large munition contracts.

Important buying on the part of a number of the railroads, was a feature of the week. Good-sized requirements were placed by the Rutland railroad, Chicago, Rock Island & Pacific, Chicago, Milwaukee & St. Paul, Baltimore & Ohio, New York Central and by at least two other roads. Several other railroads, particularly in the east, have issued inquiries on which early action is expected. Among these are the New York Central and the Baltimore & Ohio, which are expected to add to their purchases of the past week. So urgent are the requirements in some cases that these interests are negotiating and placing orders by long distance telephone. The Southern Pacific railroad has put out several small inquiries.

New Ship Building Concern Planned

Ship building companies on the Atlantic seaboard continue active buyers. The Wm. Cramp & Sons Ship & Engine Building Co., which has been a heavy buyer during the past few months, has just placed a contract with the McMyler Interstate Co. for three additional 10-ton cranes of the revolving ship building type. The Standard Ship Building Co., 10 Bridge street, New York, which recently purchased a site on Shooters island, is drafting plans and is expected to purchase extensively soon. The General Erecting & Improvement Co., 9 East Fortieth street, New York, is figuring on ship building cranes and other equipment for a ship building concern which, it is understood, will be organized to establish a new plant at Newport News, Va. This concern, it is said, will be known as the Continental Dry Dock & Ship Building Co. and will be capitalized at $10,000,000. The Croce Automobile Co., Asbury Park, N. J., which is engaged in the assembling of automobiles, is inquiring for machine tools. It is understood this concern is planning not only to assemble automobiles but to manufacture them.

Among eastern concerns who are expanding their capacity are the Davis Storage Battery Co., Lynn, Mass.; Autocar Co., Oakmont, Pa.; Mershon Patent Grate Co., Philadelphia; Baldwin Locomotive Works, Philadelphia; Lionel Mfg. Co., Newark, N. J.; Victor Talking Machine Co., Camden, N. J.; Brockaway Motor Co., Cortland, N. Y.; Hale & Kilburn Co., Philadelphia, and Keystone Ordnance Co., Chester, Pa.

Chicago Market Lively

DEMAND for certain kinds of tools needed for munitions production continues strong with foreign buyers visiting that market frequently. Demand from domestic users of machine tools for other than war purposes is on the increase and inquiries are from a widely diversified trade. Automobile manufacturers are filling their assortment and a steady demand for machinery from this source is being experienced. Second hand tools are equally in demand but the supply has been well picked over and comparatively few are now available.

Steel Plants Making Improvements

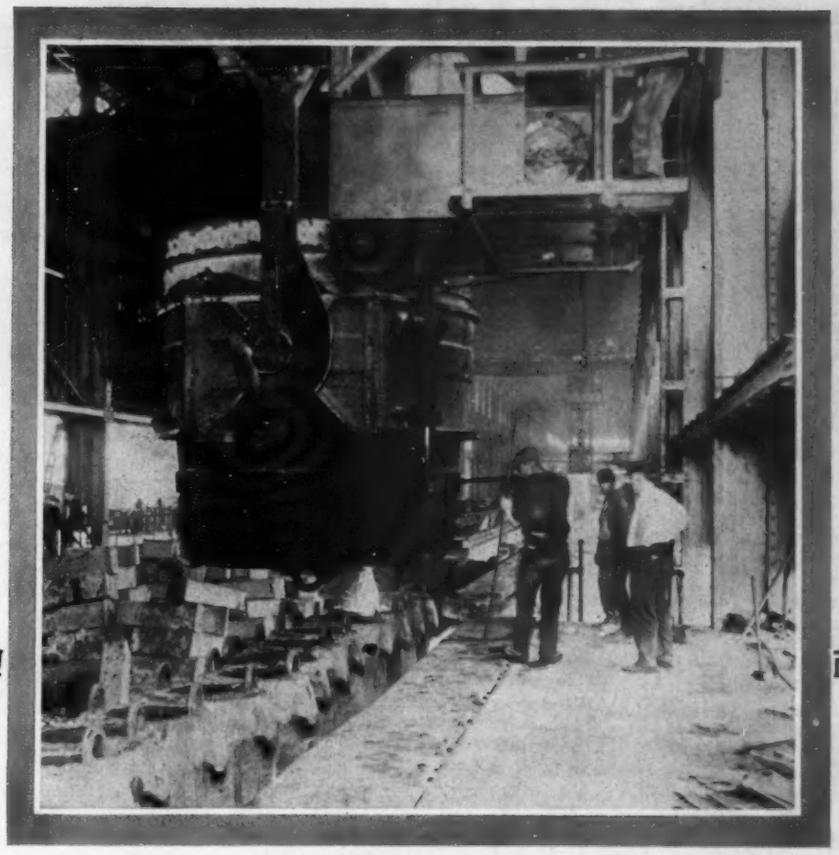
NUMEROUS extensions are being made to plants in the greater Pittsburgh district. The American Steel & Wire Co. will add two bessemer converters, a metal mixer and four soaking pits to its plant at Donora, Pa. The Pittsburgh Steel Co. is building three additional open hearth steel furnaces, contracts for which have been placed. The Crucible Steel Co. of America is increasing the capacity of its shafting department and another shafting manufacturer is installing additional drawing equipment. The 20-mill addition to the plant of the McKeesport Tin Plate Co., McKeesport, Pa., will be completed next May. Contracts for rolling mill equipment and auxiliary machinery are being placed.

Cleveland Market Slumps

CLEVELAND dealers report a sudden slack in the demand for machine tools. Several good sized inquiries that were practically closed a few days ago have been postponed until a later date. The deferred delivery now being quoted is no doubt responsible for this condition. Inquiries however are very frequent, but no definite action is being obtained. There is a marked demand for second hand equipment, and one dealer reports the present market stronger than at any time in the history of this line in that district. The high prices asked for used tools tends to stifle the demand. Tool makers feel that the shortage of high speed steel and the recent advance in the market quotations of this product will seriously handicap this branch of the tool market.

Cincinnati Building Activity Marked

A LARGE number of machine tool plants and foundries in Cincinnati are adding to their facilities. It is now almost assured that the R. K. LeBlond Machine Tool Co. will build an extensive machine tool plant early in 1916, and the American Tool Works Co. has purchased adjoining buildings until it now has a frontage of 260 feet on Eggleston avenue, 235 feet on Pearl street, and 122 feet on Third street. The Huenefeld Co. has plans posted for a 6-story build-



Pouring Ingots

Efficiency in Handling Hot Metals

THE intermediate stage between the iron leaving the furnace and its going to the rolls proves a very important period in the manufacture of high grade steel. Many opportunities constantly arise whereby the quality may be greatly impaired.

Therefore, lest the new metal be injured by improper handling, we have provided elaborate, modern equipment consisting of ingot molds, ingot buggies, ladles, cranes, etc., and these we have placed in charge of reliable, experienced men who fully realize the importance of extreme care, and who are thoroughly capable of assuring it.

By attaching the greatest of importance to even the small details, we are able to place upon the market

"AGATHON" STEELS—

steels that are every day surprising the most particular users of the nation.

AGATHON STEELS

"AGATHON" Chrome Nickel
"AGATHON" Chrome Steel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steel

AGATHON STEELS

"AGATHON" Special Analyses
"AGATHON" Vanadium
"AGATHON" Silico-Manganese
"AGATHON" High Carbon

THE CENTRAL STEEL COMPANY

MASSILLON, OHIO

Detroit Office: 326-27-28 Ford Bldg., F. Walter Guibert, District Representative
Cleveland Office: Hickox Bldg. - The Hamill-Hickox Co., District Representative

ing, 200 x 246 feet, and the Buckeye Foundry Co. will build an addition, 82 x 142 feet. The Elmwood Castings Co., which is now erecting a building, 114 x 200 feet, will add another of about the same dimensions in the near future. The call for second hand machine tools is greater than at any time in the history of the Cincinnati market. Demand from Sweden for all kinds of machine tools has been very heavy, but Cincinnati builders are selling mostly to domestic users.

EASTERN STATES

AUGUSTA, ME. — The Prince-Groff Co., Inc., has been incorporated as machinists, founder and metal worker; $5,000 capital stock; by E. Maynard Thompson, L. H. Stevens and I. S. Kearney.

BANGOR, ME.—The American Ordnance & Engineering Co. has been incorporated; $1,000,000 capital stock; by Lawrence V. Jones, James D. Maxwell and John R. Mason.

BIDDEFORD, ME.—The Hinchliffe Motor Co. has been incorporated to manufacture engines; $500,000 capital stock; by John A. Snow, Scarboro, Henry H. Goodwin and Frank B. Ross.

PORTLAND, ME. — The Paragon Metal Products Co. has been incorporated; $100,000 capital stock; by Albert F. Jones, T. L. Croteau and George S. Soule.

PORTLAND, ME.—The Yellow Cab Co. has been incorporated to manufacture autos, taxicabs, trucks, etc.; $1,550,000 capital stock; by Albert F. Jones, T. L. Croteau and A. B. Franham.

AMESBURY, MASS.—The Gray & Davis Co. has closed an order for 500,000 brass cases for shells to be made at the local plant. In order not to interfere with the regular manufacture of automobile lamps, additional space has been secured.

BOSTON.—Plans are being prepared for a 2-story, brick, 184 x 185-foot addition for foundry and storehouse for the Stafford Co., builder of weaving machinery. Plant will be erected at Readville.

LYNN, MASS. — The Davis Storage Battery Co. has taken a factory on Chestnut street and plans to commence operations about Feb. 1.

LOWELL, MASS.—The Newton Mfg. Co., is equipping an extensive plant for the manufacture of munitions in the property of the old Atherton Mfg. Co., at Atherton, on the outskirts of the city.

MALDEN, MASS. — H. H. Kelley & Co., 230 Purchase street, Boston, have commenced work on a 2-story and basement, 45 x 130-foot factory building.

PITTSFIELD, MASS.—The Berkshire Magneto Co., a recently organized $150,000 Massachusetts corporation, has taken over the entire magneto business of the Pittsfield Spark Coil Co. at Dalton and plans to make high tension magnetos.

SPRINGFIELD, MASS.—The Fiberloid Co., Worcester street, has started work on two new factory buildings, each 1-story and basement and 35 x 39 and 28 x 28 feet, respectively.

SPRINGFIELD, MASS. — The Springfield Body Co. has been incorporated; $1,000,000 capital stock; by Walter L. Fry, Earl W. McGookii, Arthur P. Smith, Hinsdale Smith and Frederic W. Fuller.

SPRINGFIELD, MASS.—The Brown, Gates Co. has been incorporated to make vacuum cleaners; $50,000 capital stock; by Charles P. Whitall, Roy C. Whitall and Herbert O. Brown.

WORCESTER, MASS. — The Graton & Knight Mfg. Co., is adding a 60 x 90-foot boiler house and coal bunker to cost $10,000. The project also includes a 1,750-foot radial chimney.

HARTFORD, CT. — The Hartford Special Machinery Co. has bought a triangular piece of land at the corner of Woodland street and Homestead avenue for future development. The company is occupying a building just completed at 287 Woodland street.

HARTFORD, CT.—The Pratt & Cady Co., has bought the Cushman Chuck Co.'s old factory on Cushman street for $30,000 and will occupy it immediately for shipping and storage and light manufacturing. It is a 2-story building of mill construction containing approximately 25,000 square feet of floor space.

MERIDEN, CT.—Louis Fiske, Branford, Ct., is president and Robt. O. Eaton, Northhaven, secretary and treasurer, of a company which will build a 20-mile trolley line from Meriden through Kensington, New Britain, and Newington, to Hartford.

NEW BRITAIN, CT.—The Hart & Cooley Mfg. Co., has awarded the contract for the addition of two stories to its factory on Booth street. It will afford approximately 20,000 square feet of floor space which will be occupied partly by the company and by the Fafnir Ball Bearing Co. The latter will install new machinery in the addition.

PLANTSVILLE, CT.—The Blakeslee Forging Co., which has just completed a large addition to its plant, finds it necessary to enlarge further. The company has recently added six drop hammers to its equipment.

SPRINGDALE, CT.—The Stamford Rolling Mills, which are building a brick building at Springdale, have had plans prepared for another factory which will probably be erected during the winter.

STAMFORD, CT. — Richards & Co., will build a 93 x 186-foot addition to its plant to be used for making tools.

STAMFORD, CT. — The Yale & Towne Co., Baer Bros. Mfg. Co., and the American Synthetic Color Co., have planned additions to their factories. The latter company's plant was recently damaged by fire and it will erect a factory building.

STAMFORD, CT.—Plans are being prepared for the erection of a rolling mill and a casting shop for the American Cupro-Nickel Co. The mill will be 113 x 180 feet and the casting shop, 45 x 125 feet, both of brick construction. Additional buildings will be erected in the future.

WATERTOWN, CT.—Heminway & Bartlett have taken bids on a 2-story, 32 x 37-foot factory addition.

WINSTED, CT.—Fire caused considerable damage at the bolt manufacturing plant of the Franklin Moore Co.

BINGHAMTON, N. Y. — C. H. Mitchell, State street, contemplates the erection of a 2-story, 80 x 160-foot factory building.

BROOKLYN, N. Y.—A. L. Fogel, 534 Myrtle avenue, is having plans prepared for a 2-story, 100 x 100-foot factory building.

BROOKLYN, N. Y.—Abraham Koeppel, 330 Utica avenue, will take bids on construction of two 1-story, 48 x 85-foot factory buildings.

CORTLAND, N. Y.—The Brockaway Motor Co. is beginning work in a 2-story, 40 x 186-foot factory building, to cost about $15,000.

NEW YORK.—Atlas Powder Co., 200 Fifth avenue, has taken options on 368 acres in Sayreville township, Middlesex county, N. J., and it is likely the company will locate a plant on the site.

NYACK, N. Y.—Joseph P. Day has sold to the Kathodion Bronze Works of New York, the plant of the United Piece Dye Works. The plant will be put in condition for the manufacture of small arms and ammunition.

ROCHESTER, N. Y. — C. W. Brownyard has let a contract for a 1-story, 100 x 100-foot plant.

BOYERTOWN, PA.—The Union Mfg. Co. will begin work shortly on the construction of a factory addition.

CHESTER, PA.—The Keystone Ordnance Co., of which W. H. While, former vice president of the Maryland Southern railroad, is president, contemplates the erection of a plant at Chester.

CLAYSVILLE, PA.—The city of Claysville has awarded contracts for a new school.

FRANKLIN, PA.—The Chicago Pneumatic Tool Co. plans to double the capacity of plant No. 2.

FRANKLIN, PA.—The Colburn Machine Tool Co. has decided to postpone until spring the erection of a 1-story, 20 x 100-foot factory addition.

HAZLETON, PA. — Citizens have voted $140,000 in bonds for a school.

JOHNSTOWN, PA.—John L. Elder, Ebensburg, Pa., has been awarded the general contract for the Horner street bridge.

KANE, PA.—The Aluminum Co. of America, Oliver building, Pittsburgh, has taken over the French aluminum plant at Kane and will make a number of improvements.

LEWISTON, PA.—The board of education will build a $100,000 high school building. J. H. Stanton is secretary.

MONONGAHELA, PA.—Charles J. Reiger, Germania Bank building, Pittsburgh, is the architect for the new Waverly school.

MONONGAHELA, PA.—The contract for the United States post office building has been awarded to James Devault, Canton, O.

NEW BRIGHTON, PA. — A municipal lighting plant is being considered by the borough council.

NEW FREEDOM, PA.—McCawley & Co., Lombard and Commerce streets, Baltimore, have let a contract for a 1-story, 30 x 100-foot factory building.

OAKMONT, PA.—Stearns & Castor, Philadelphia, are preparing plans for a 3-story, brick and concrete factory, 150 x 300 feet, to be erected for the Autocar Co., at Oakmont.

PHILADELPHIA.—The Baldwin Locomotive Works has received bids for the construction of a 4-story, 89 x 98-foot shop building, to be used for building electric trucks.

PHILADELPHIA.—The Mershon Patent Brick Co. is receiving estimates for a 2-story, brick factory building, to be erected at 1604 North Carlisle street.

PHILADELPHIA.—The Hale & Kilburn Co., Eighteenth and Lehigh avenue, has let a contract for a 1-story, 26 x 116-foot factory addition.

PITTSBURGH.—The Crucible Steel Co. of America is increasing capacity of its shafting department at the Nimick works.

PITTSBURGH. — The Independent Bridge Co. is low bidder on a service bridge for Dam No. 10, Ohio river. Government engineers are in charge of the work.

PITTSBURGH.—The Northern Realty Co. will build a store and apartment building on Federal street, North Side, to cost $40,000. W. E. Suman, Empire building, is the architect.

POTTSTOWN, PA.—The National Rubber Co. will build a 2-story, 134 x 170-foot factory building and power plant. M. N. Shoemaker, Union building, Newark, N. J., is the architect.

SHARON, PA.—J. B. Roux has awarded a

contract for a grain elevator to the Farrell Building Co.

WILKINSBURG, PA.—The Pennsylvania Water Co. will build a 2-story office building. Schutz, Schreiner & Clyde, May building, Pittsburgh, have the contract.

BONHAMTON, N. J. — The Apex Powder Co., with offices in Cedar street, New York, has acquired 200 acres on the Raritan river, adjoining the Metuchen Gun Cotton mill, and will begin immediately the construction of a plant.

BUTLER, N. J.—The American Hard Rubber Co. will build a 2-story, 50 x 300-foot addition.

CAMDEN, N. J.—The Victor Talking Machine Co. is having plans prepared by Ballinger & Perrot, architects, Philadelphia, for two factory buildings, 4 stories, 91 x 274 feet, and six stories, 76 x 233 feet, to be added to the plant at Camden.

CLAYTON, N. J. — The Clayton Chemical Co. is putting the Moore Bros. brass works in shape for the manufacture of munitions. No details as to the plans of the company have been announced. Carloads of nitric acid are arriving at the plant daily.

DOVER, N. J.—The Brixite Explosives Co. has acquired a site at Spicertown, and will erect several frame buildings for the manufacture of explosives. Henning G. Taube, Bloomfield, N. J., J. Alex Dingwell Jr., 446 Ocean avenue, Brooklyn, Walter Carrol Low, 346 Broadway, New York, and others, are interested.

ELIZABETH, N. J.—Bids have been received for the erection of a 2-story, 100 x 221-foot factory and a 1-story, 24 x 50-foot garage, for the American Gas Accumulator Co., Perry building, Philadelphia.

NEWARK, N. J.—The Celluloid Co. has been granted a permit for the erection of a 2-story brick machine shop to cost $10,000.

NEWARK, N. J.—The Lionel Mfg. Co., 48 East Twenty-first street, New York, is having plans prepared for the erection of a 2-story toy factory on a 225 x 228-foot site.

TRENTON, N. J.—The John A. Roebling's Sons Co. announces that its subsidiary, the Durable Wire Rope Co., of Boston, has purchased the wire rope machinery of the Spencer Wire Rope Co., Worcester, Mass. The machinery will be operated by the Durable Wire Rope Co. on material shipped from Trenton.

BALTIMORE, MD. — The Refractory Zinc Ore Treatment Co. will build a 1-story, 40 x 50-foot factory to cost $10,000. Fulton & Blair, 207 Market street, Newark, N. J., are the engineers.

CENTRAL STATES

BATAVIA, O.—The American Milling Machine Co. has increased its capital stock from $10,000 to $12,000.

CINCINNATI.—The Buckeye Foundry Co. will build an addition to the main foundry building which will be 82 x 142 feet, to cost $6,000 exclusive of equipment.

CINCINNATI.—Plans for the erection of the new plant of the R. K. LeBlond Machine Tool Co. will be put upon the market early in 1916.

CINCINNATI.—Ground has been broken for the East high school, which will cost $400,000. The Ferro-Concrete Construction Co. has the general contract for the erection of the building.

CINCINNATI. — The Elmwood Castings Co., which is having plans prepared for an addition 114 x 200 feet, will build another addition on the south of the present plant. The dimensions and general details have not been determined.

CINCINNATI.—Plans for the new plant of the H. Huenefeld Co., to be built in Camp Washington, a suburb, posted by Stegner and Hughes, architects, call for a building 200 x 246 feet, six stories with a basement and subbasement.

CINCINNATI.—The Peters Cartridge Co. will build an entirely new plant at Kings Mills near Cincinnati. New equipment will be installed throughout. The first new building will be erected at once. It will be four stories and will contain 100,000 square feet of floor space and cost $200,000 exclusive of equipment.

EAST YOUNGSTOWN, O.—The city of East Youngstown will build a 1,000,000-gallon mechanical filter, pumping station, gas engine driven pumps, distributing system, contracts for which will be let at an early date; Chester & Fleming, engineers, Pittsburgh, are in charge.

NEW PHILADELPHIA, O.—New Philadelphia Paving Block Co. will build a plant, contract for which will be placed early in December.

WADSWORTH, O.—The Wadsworth Aluminum Co. has been incorporated to manufacture aluminum products; capital stock, $20,000; by W. C. Washburn, L. B. Washburn, H. W. Heckman, P. R. Miller, and J. J. Dildine.

YOUNGSTOWN, O.—The Carnegie Steel Co. will build three additional open hearth furnaces.

YOUNGSTOWN, O.—The board of education plans to build a 16-room school building on Pine Hollow site and a 12-room school on Stambaugh site.

Inquiries From All Points of the Compass

The A. M. Wood Co., Inc., Commercial Trust building, Philadelphia, advises that it is in the market for about 200 turret lathes for immediate delivery. All correspondence should be addressed to A. J. Hofmann.

The United States Electric Mfg. Co., Los Angeles, Cal., will rebuild its plant, recently damaged by fire to the extent of $50,000. Carl E. Johnson, general manager, desires correspondence regarding equipment.

The Oklahoma Consolidated Mining & Milling Co., St. Joe, Ark., will install tables, rollers, elevators, steam drills, turbines or dynamos and an air compressor. William E. Hancock is consulting engineer.

The El Paso Smelting & Refining Co., El Paso, Tex., plans the erection of a steel structure and will install converters and a number of traveling cranes. The estimated cost of the improvements is about $300,000.

The Buckeye Machine Co., Ltd., Calgary, Alta., advises that it will be in the market shortly for two or three turret lathes, having about a 22-inch swing, and a 2 or 2½-inch spindle. Also for three vertical 32 or 36-inch drills, and four or five 18 to 22-inch engine lathes. Second-hand equipment will be considered. All correspondence should be addressed to G. J. Buckeye.

CHARLESTOWN, W. VA.—F. L. Whitney and W. S. Mason plan to build a modern theater and concert hall.

CHARLESTOWN, W. VA. — The Biago Fruit & Produce Co. will build a cold storage, ice plant and office building, to cost $50,000; Paul M. Egan is the architect in charge.

HUNTINGTON, W. VA.—The Strochamnns Vienna Bakery Co. will build a 2-story, 90 x 100 feet, bakery and office building, to cost $40,000; C. D. Couley, architect, Pittsburgh, is in charge.

WHEELING, W. VA.—The Royal Southern Amusement Co. will build a theater and amusement hall to cost $150,000.

WHEELING, W. VA.—The board of education of Richland district will hold election to vote on $85,000 bonds for a new school.

WHEELING, W. VA.—The Kalbitzer Packing Co. will build a 2-story, 175 x 200-foot, packing plant. Charles W. Bates is preparing the plans.

AUGUSTA, KY.—The Burley Tobacco society is taking bids for a 172 x 280-foot steel tobacco warehouse.

BEREA, KY.—The electric light plant which the Isaacs & Baker Co. will install will cost $12,000. Equipment is now being purchased.

DIXON, KY.—R. L. Jackson and R. M. Baker are arranging for the installation of an electric light plant.

GLASGOW, KY. — J. C. Preston will probably purchase equipment for an automobile garage now building.

LEXINGTON, KY.—The American Metallic Packing Co. is asking for prices on an air compressor with a capacity of 400 cubic feet per minute. Second hand equipment will be considered.

LOUISVILLE, KY.—The Louisville Gas & Electric Co. is expected to begin work on its central steam heating system early in January. Donald McDonald is general manager.

LOUISVILLE, KY. — The Kentucky Distilleries & Warehouse Co. is altering a number of distilling plants to enable them to produce alcohol for a 26,000,000-gallon order received from abroad.

LOWER ELK, KY.—The sawmill of the W. N. Ritter Co., Pike county, was recently damaged by fire to the extent of $100,000. The concern plans to rebuild.

PADUCAH, KY.—A. N. Mason is purchasing machine tools for a shop.

SARDIS, KY.—J. M. Wheatley Jr., plans to install an electric light plant of small capacity. A gasoline engine will be purchased.

WINCHESTER, KY.—James Love, Lexington, Ky., has taken over the plant of the Eagle Castings Works under lease.

EAST CHICAGO, IND. — The Standard Forgings Co. will erect two 1-story buildings, 62 x 202 feet and 56 x 266 feet.

EAST CHICAGO, IND. — The American Steel Foundries will build a 1-story addition 178 x 300 feet at 138th street nad Michigan avenue.

ELKHART, IND.—The Sun Motor Car Co., of Buffalo, has bought the plant of the Sterling Motor Car Co., Elkhart, and will remove there.

INDIANAPOLIS, IND.—Pennsylvania Lines West, W. C. Cushing, Pittsburgh, chief engineer, will take bids soon for a 1-story freight depot, 70 x 800 feet, of brick and steel, to cost $300,000.

INDIANAPOLIS, IND.—The Twin Sagless Spring Co. has been incorporated to manufacture metal beds and other furniture; $10,000 capital stock; by Paul Parr, D. Rowlen and C. G. Moore.

KOKOMO, IND.—A company has been organized to manufacture steel fence posts by Carl Broo, P. Redmond and Eugene Laymon.

KOKOMO, IND.—The Conron McNeal Ice Skate Co. is having plnas prepared for an office building of steel and brick, 1-story, 80 x 126 feet, to cost $5,000.

LEBANON, IND. — The Industrial Wheel Co. is building an addition 36 x 55 feet for a boiler room and will install a 150-horsepower boiler.

MICHIGAN CITY, IND.—Bonds for $75,000 have been voted for water works improvements.

RICHMOND, IND.—The American Lathe & Brace Co., R. J. Beck, president, is planning to erect a plant.

SOUTH BEND, IND.—The South Bend Gear Co. has been incorporated to manufacture gears; $25,000 capital stock; by E. B. Clark, K. K. Knapp and A. E. Kuhn.

BELLEVILLE, ILL.—The city council is considering plans for a municipal electric light plant.

CENTRALIA, ILL. — The Peyton Safety Rail Joint Co. has been incorporated; $200,000 capital stock; by G. W. Witwer, Warren Perry and Isaac Peyton.

CHICAGO. — Morris & Co., packers, will build a 2-story distillation plant on Ashland avenue to cost $31,000.

CHICAGO. — The Electric Steel Co. has been incorporated; $60,000 capital stock; by P. L. Coonley, A. C. Wild and Charles Piez, Thirty-ninth and Stewart avenue.

CHICAGO.—The Chicago Gold Coin Stove Works has been incorporated; $20,000 capital stock; by E. B. Van Veen, E. F. Jones and N. E. Heelan.

LEMONT, ILL.—The Aluminum Products Co. will build a steel factory, 54 x 70 feet, to cost $15,000.

MOLINE, ILL.—The Moline Tool Co. will build an addition 150 x 200 feet.

MONMOUTH, ILL.—The Western Boiler Pipe Co. has been incorporated to manufacture culvert pipe; $100,000 capital stock; by J. H. Jayne, E. E. Wood and H. E. Miller.

PEORIA, ILL.—The Holt Mfg. Co., M. M. Baker, manager, will build a foundry of 100 tons capacity.

TAYLORVILLE, ILL.—Fire recently damaged the car shops of the Midland railroad at Taylorville to the extent of $50,000.

WEST CHICAGO, ILL.—The Union Tool Co. is preparing plans for a considerable enlargement of its plant.

ALMA, MICH.—The Alma Standard Foundry Co., manufacturer of small castings, will move to Saginaw and undertake the manufacture of malleable castings.

ANN ARBOR, MICH.—The Hoover Steel Ball Co. has increased its capital stock from $250,000 to $500,000 and will enlarge its plant materially.

BATTLE CREEK, MICH.—American Steam Pump Co. will build a 1½-story addition, 52 x 103 feet, at 156 Upton street. R. R. Wilder, Jefferson street, is the purchasing agent.

DETROIT.—The Roberts Brothers Mfg. Co. is building an addition.

DETROIT.—The Hehle Mfg. Co. has been incorporated to conduct a machine shop business; $15,000 capital stock; by Charles F. Hehle, Francis J. Wallace and Harry C. Milligan.

DETROIT. — The Automatic Carburetor Regulator Co. has been incorporated to manufacture automobile accessories; $15,000 capital stock; by George Holland, Louis A. Kreis and Fred A. Embleton.

DETROIT.—The Ainsworth Mfg. Co. has been incorporated to manufacture automobile accessories; $100,000 capital stock; by Charles H. Ainsworth and Alonz O. Ewing. Equipment will be installed in plant which has been leased.

FLINT, MICH. — The Imperial Wheel Works has increased its capacity 50 per cent by additions and improvements.

GRAND RAPIDS, MICH.—The Fox Typewriter Co. is planning to erect a factory and foundry 90 x 300 feet, costing $30,000.

GRAND RAPIDS, MICH.—The Wolverine Self Starter Co. has been incorporated to manufacture self starters for automobiles; $10,000 capital stock; by W. J. Clark and H. C. Cornelius.

GRAND RAPIDS, MICH.—The Kent Steel & Construction Co. has been incorporated; $5,000 capital stock; by Raymond F. Smith, Frank F. Bowles and R. M. Judd, will engage in erection work and plans to undertake fabricating next year.

MANISTEE, MICH.—The McClellan Refrigerating Machine Co., Chicago, has procured a plant at Manistee and will build ice making machinery.

MONROE, MICH.—The Van Blerck Motor Co. will build a 1-story machine shop, 80 x 150 feet. Ernest McGeorge, engineer, 853 Leader News building, Cleveland, is in charge of the work.

PLYMOUTH, MICH. — The Daisy Mfg. Co., maker of air rifles, will build an addition.

PORT HURON, MICH.—The Romeo Foundry Co. has bought the plant of the Havers Motor Car Co. and will remodel it.

EAU CLAIRE, WIS.—The Gillette Safety Tire Co., capital stock, $1,000,000, has practically closed a deal to locate its permanent works in Eau Claire. It is intended to build a plant, and the company is about to exercise options on part of the site of the former mills of the Northwestern Lumber Co.

HARTFORD, WIS. — A new assembling building is being erected by the Kissel Motor Car Co. and plans are being prepared for an administration building to be built next year. The assembling building will be 71 x 315 feet, three stories, of mill construction, to be ready April 1. The company has just completed work on a new enameling building and a warehouse addition.

LOWELL, WIS. — The Lowell Light & Power Co. has plans ready for an electric light plant to cost $10,000.

MADISON, WIS.—Plans are being prepared by Gardner & Lundberg, 140 South Dearborn street, Chicago, for the Farmers' Co-Operative Packing Co. for a 1 and 2-story packing plant of reinforced concrete and steel to cost $200,000.

MARION, WIS.—The Helms Motor Co. is building a fireproof garage and machine shop, 48 x 96 feet.

MERRIMAC, WIS.—A. W. Farnsworth has been granted a franchise for an electric light plant.

MILWAUKEE.—Plans are being prepared for a bridge at North avenue to cost $240,000.

MILWAUKEE.—Auto Truck Service Co. is building an addition to its machine shop and garage at 946 Third street.

MILWAUKEE. — The Standard Crucible Steel Casting Co. plans to erect a 1-story pattern shop, 40 x 40 feet, to cost $2,000.

MILWAUKEE.—The Sterling Tool Mfg. Co. has been incorpoarted to manufacture power and hand tools; $10,000 capital stock; by Joseph Mietus, Stanley Schultz and Stanislaus Prazynski.

MILWAUKEE.—The Neldner Hub Motor Co. has been incorporated to manufacture mechanical devices for automobiles; $25,000 capital stock; by Stephen W. Neldner, John J. McJeskey and John A. Stover.

MILWAUKEE.—The A. O. Smith Co. will build a boiler house at Twenty-Seventh and Hopkins street, costing $35,000. It will be 40 x 70 feet, of steel and brick and will be equipped with three 300-horsepower boilers. Thomas S. Watson Co., 1412 Majestic building, is the engineer.

MILWAUKEE.—The Industrial Controller Co., 886 Greenbush street, has organized the Industrial Mfg. Co., with a capital stock of $50,000. The incorporators are Charles Gale Welch, Frank W. Magin and James B. Welch, who are the principal officers of the Controller Co.

MILWAUKEE.—The Advance Engineering Co., Thirtieth street and North avenue, has broken ground for a machine shop to cost about $30,000. It will be of solid brick and steel, 1-story and basement, 120 x 220 feet. The steel work has been awarded to the Milwaukee Structural Steel Co. Herbst & Hufschmidt are the architects.

OSHKOSH, WIS. — Charles H. Warning Co., sheet metal contractor, is building 2-story brick and concrete addition and has leased part of the added space to the Oshkosh Paper Box Co.

OSHKOSH, WIS.—The organization of a corporation to manufacture and market the Luxmore differential gear for automobiles, tractors, trucks, etc., designed by L. Luxmore, Chicago, is proposed. F. H. Josslyn, Oshkosh, is interested.

RACINE, WIS.—The Corliss Steel Co. has been incorporated to build automobiles, tractors, farm machines and other metal products; $10,000 capital stock; by F. Lee Norton, Wm. M. Lewis and Herbert F. Johnson. It is reported part of the plant of the Wisconsin Engine Co. at Corliss, Wis., will be utilized.

SHEBOYGAN, WIS.—The city of Sheboygan will purchase a 12,000,000-gallon pumping engine and a 300-horsepower boiler for the municipal waterworks system. John M. Steinle is city clerk.

TOMAH, WIS.—Emil Janke, Tomah, Wis., intends to build a modern, fireproof garage and machine shop to replace the frame structure damaged by fire. Plans are being prepared.

KANSAS CITY, MO. — The Gyp Steel Products Co. has been incorporated; $20,000 capital stock; by James P. Sprague, J. A. Henley and James Mularkey.

KANSAS CITY, MO. — The Kansas City Terminal Co. will eliminate several grade crossings at a cost of $600,000 and will use considerable structural steel. H. H. Adams is president.

ST. LOUIS.—The McKenzie Mfg. Co. will equip a plant for making wire curtain rods. J. B. Horstman, 2820 Clark avenue, St. Louis, is president.

SPRINGFIELD, MO.—Council has appropriated $400,000 for a municipal electric light plant. A special election will be held Jan. 11 on issuing bonds.

TRENTON, MO .— The Trenton Gas & Electric Co. is planning to spend $100,000 for plant improvements.

DES MOINES, IA.—The Perkins Mfg. Co. has been incorporated to manufacture machinery, auto accessories and mechanical devices; $10,000 capital stock; by Harry M. Strong, Vernon R. Seeburger and LeRoy Perkins.

FORT DODGE, IA.—Bonds for $100,000 have been voted for a power dam in the Des Moines river.

MINNEAPOLIS.—Pence Auto Co., care of H. E. Pence, is to build an 8-story, 132 x 308-foot warehouse. Chapman & Magney, Essex building, are the architects.

ST. PAUL.—The Helwig Mfg. Co., manufacturer of pneumatic tools and drop forgings, is preparing to erect a new factory.

SOUTHERN STATES

DALLAS, TEX.—The Union Terminal Co. is preparing plans for a power plant to cost $40,000.

GOLDTHWAIT, TEX.—Bonds for $31,000 have been voted for a water works plant.

EL PASO, TEX.—The El Paso Smelting & Refining Co. is planning a steel structure and will install converters and traveling cranes, improvements to cost $300,000.

HUNTSVILLE, TEX. — The commissioners

of Walker and Trinity counties, Huntsville and Grover county seats, will build a bridge over Trinity river connecting the counties at a cost of $50,000.

PORT ARTHUR, TEX.—The Port Arthur Gas & Power Co., recently incorporated with $250,000 capital, will build an electric power station and gas plant.

TYLER, TEX.—The city commission will construct a water works system costing $250,000.

OSCEOLA, ARK. — Commissioners of the drainage district No. 16, Mississippi county, will construct 21 steel bridges with 34-foot spans, two bridges with 36-foot spans and two bridges with 80 foot spans. Pride & Fairley, Osceola, are the engineers.

OZARK, ARK.—The Ozark Light & Power Co. has bought the electric light plant at Ozark and will install a 75-horsepower diesel engine. W. C. Bill and A. W. Dupreast are interested.

ST. JOE, ARK.—The Oklahoma Consolidated Mining & Milling Co., William E. Hancock, consulting engineer, will install tables, rollers, elevators, steam drills, turbines or dynamos and an air compressor.

WILMOT, ARK.—Ashley county commissioners, Hamburg, Ark., have applied for a permit for the erection of two bridges to be located at Wilmot and Montrose.

CHATTANOOGA, TENN. — The United States Cast Iron Pipe & Foundry Co. will build an addition to its local machine shop for the manufacture of flanged pipe and fittings.

CHATTANOOGA, TENN.—A $250,000 cotton spinning company is being organized by G. H. Miller and John Staigmayer, Chattanooga; Albert G. Thatcher, Philadelphia, and others. Work on the proposed plant will begin at once.

FLEMINGSBURG, TENN. — In order to finance improvements, including installing equipment for the production of alternating instead of direct current, the Flemingsburg Light & Ice Co. has increased its capitalization from $12,000 to $20,000.

NASHVILLE, TENN.—The Rock City Auto & Storage Co. is equipping a repair shop, and is in the market for a full line of equipment, including lathes, drill presses, emery wheels, etc.

SOUTH PITTSBURG, TENN.—The Aycock Hosiery Mills has let a contract for the erection of a building to be used for dyeing purposes, and will purchase the equipment.

COMMERCE, OKLA. — A special election will be held soon on issuing $40,000 in bonds for a water works system. Benham Engineering Co., Oklahoma City, is the engineer.

FAIRFAX, OKLA. — C. J. Huffaker will equip an electric light and power plant, including a 40-horsepower oil engine and 30-kilowat, three phase, alternating generator.

McALESTER, OKLA.—C. W. Dawley has bought the McAlester Metal Bed Factory and will organize a company to operate it.

SAN SPRINGS, OKLA.—The Patch Brothers Tractor Co., Oshkosh, Wis., will build a plant at San Springs for the manufacture of farm tractors.

WESTERN STATES

COFFEYVILLE, KAS.—The city council is considering installing additional equipment for the electric light plant.

LAWRENCE, KAS.—Bids will be received until Dec. 14 by H. Broeker, clerk of county commissioners, for a steel bridge with a 118-foot span.

OSWEGO, KAS. — Water works improvements recently voted on including a 1,000,000-gallon low service pump, boiler feed pump, 1,000,000-gallon mechanical filter, 1½ miles of cast iron pipe and a 100,000-gallon steel tank on a 100-foot tower. A. C. Moore, Joplin, Mo., is the engineer.

PERRY, KAS.—Bonds for $5,000 have been voted for additional equipment to the electric light plant.

HARDIN, MONT.—Work on the Big Horn Canyon Irrigation & Power Co. project southwest of Hardin, is to start in the near future, having been approved by the reclamation service. It is estimated that 175,000 to 200,000 horsepower will be developed.

MILES CITY, MONT.—H. A. Koehler & Co. have applied for a gas franchise and if granted will construct a $50,000 plant.

POWELL, WYO.—The city of Powell will build a municipal water works system costing $20,000. The Green Engineering Co., Spokane, Wash., are the engineers.

PENROSE, COLO.—The Beaver, Penrose & Northern railroad will build shops and round house at Penrose. C. G. Whitlock is the engineer.

SALT LAKE CITY.—The Silver Brothers Iron Works Co. has been taken over by the Salt Lake Iron & Steel Co., recently organized. Considerable improvement will be made by the new owners who have a capital of $300,000. O. C. Beebe is president and J. W. Silver, manager.

NEW PLYMOUTH, IDA. — R. S. White, president of the New Plymouth Water Co., has asked a franchise for a water works system which will include a pumping station and a 15,000-gallon pressure tank.

SANDPOINT, IDA. — County Engineer Chaffins has prepared plans for a bridge to cost $20,000 on the Pend d'Oreille river at Priest Rapids.

WALLACE, IDA.—The Union Iron Works of Spokane has a contract for installing an aerial tramway 1½ miles long for the Colonial Mining Co. at Wallace.

CAMAS, WASH. — The Crown-Willamette Paper Co. contemplates the erection of a machine shop here at an estimated cost of $75,000.

SEATTLE, WASH.—The Electric Construction Appliance Co. has been incorporated; $50,000 capital stock; M. J. Renn and F. M. McLemon.

SEATTLE, WASH. — The Electric Automatic Springless Faucet Co. is equipping a plant on Eighth avenue south, for the manufacture of faucets. F. F. Travis, Imperial Hotel, is preparing plans.

SEATTLE, WASH.—The Perfection Automatic Oiler Co. has been incorporated to establish a plant to manufacture a patented device; $100,000 capital stock; by H. P. McGuire, Henry Hueber and H. H. Woodworth.

BRIDGEPORT, CAL.—Bids will be received until Jan. 3 by the board of supervisors of Mono county for a steel bridge over East Walker river.

BURBANK, CAL.—Bonds for $30,000 have been voted for an electric light plant.

CORCORAN, CAL. — An election will be held in February on issuing $30,000 in bonds for a municipal water works. E. E. Speans is city clerk.

LOS ANGELES.—The United States Electric Mfg. Co. will rebuild its plant recently damaged by fire at a cost of $50,000. Carl E. Johnson, general manager, desires correspondence regarding equipment.

RIVERSIDE, CAL.—The Pacific Power Co. is planning to construct a hydro-electric plant in Mono county including two miles of tunnel through granite, 4,000 feet of steel pressure line and a 10,000-kilowatt installation of hydraulic and electric equipment. C. O. Poole, Riverside, is the engineer.

SAN FRANCISCO. — The Union Iron Works will remodel its foundry building, and build a floating dry dock and other additions to its plant at a cost of $1,000,000. John A. McGuire is president.

TAFT, CAL.—The Lakeview Oil Co. No. 2 will build a machine shop.

WHITTIER, CAL.—The city of Whittier has had plans prepared by F. U. Roberts, Marsh-Strong building, Los Angeles, for a water works system costing $100,000. Special election will be held soon on issuing bonds.

CANADA

BROCKVILLE, ONT.—The Canadian Briscoe Motor Co., Ltd., has been incorporated to manufacture automobiles and accessories; $200,000 capital stock; by Thomas J. Storey, Alfred O. Heather and Newell L. McDowell, of Brockville and others.

COLLINGWOOD, ONT. — In accordance with an agreement with the town council and the board of trade the disused plant of the Northern Iron & Steel Co. will be reopened by Messrs. Kennedy of Owen Sound for the manufacture of steel billets, the town agreeing to remit back taxes on the property.

MOUNT BRYDGES, ONT.—The Canadian Crow Motor Co., Ltd., has been incorporated to manufacture automobiles; $100,000 capital stock; by Joseph K. Kidd, Edward R. Bond and George Lowthian, of Caradoc township, and others.

TORONTO, ONT.—The H. B. McCarthy Co., Ltd., has been incorporated to manufacture leather and leather goods; $40,000 capital stock; by James C. Allan, Charles C. Allan, Geo. McCarthy Moore, of Toronto and others.

TORONTO, ONT.—The National & Foreign Co., Ltd., has been incorporated to manufacture goods and merchandise; $50,000 capital stock; by Wm. Bowler, Sydney J. L. Potter and Leonard C. Groom, of Toronto.

TORONTO, ONT.—The Auto Parts Repair Co., Ltd., has been incorporated to manufacture automobiles and other vehicles; $40,000 capital stock; by Nathan Caplan, Harry Caplan and Joseph Layevsky, of Toronto.

TORONTO, ONT.—The Canadian Locker Ltd., has been incorporated to manufacture lockers, metal goods and machinery; $100,000 capital stock; by Harry Riley, James W. Bicknell and Thomas S. H. Giles, of Toronto, and others.

TORONTO, ONT.—The Brandon Shell Co., Ltd., has been incorporated to manufacture war munitions; $100,000 capital stock; by Harold W. Shapley, Wm. B. Milliken, Gordon McLaughlin, of Toronto and others.

TORONTO, ONT.—The Atlantic Chemicals, Ltd., has been incorporated to manufacture drugs, merchandise and war munitions; $50,000 capital stock; by John G. Holmes, Chester Redmond and others of Toronto.

TORONTO, ONT.—The Ideal Foundry & Hardware Co., Ltd., has been incorporated to carry on business as iron and brass founder, machinist, etc.; $50,000 capital stock; by Arthur E. Furniss, Robert M. Yeomans and Bertram Macdonald, of Toronto.

TORONTO, ONT.—Canada Builders Ltd., has been incorporated to carry on business of general contractors and engineers; $50,000 capital stock; by Daniel J. Coffey, Clarence W. Moorhead and Frederick H. Vanston of Toronto.

MONTREAL, QUE.—The Salt Development Co. of Canada, Ltd., has been incorporated to manufacture salt; $35,000 capital stock; by Louis A. David, Louis E. A. D. Mailhiot and Samuel B. Holmes and others of Montreal.

MONTREAL, QUE.—The Reliable Oil Co., Ltd., has been incorporated to produce and refine oil, $40,000 capital stock; by Henry J. Trihey, Peter Bercovitch and Ernest Lafontaine, Montreal and others.

MONTREAL, QUE.—The Gres Falls Development Co., Ltd., has been incorporated to develop electrical power, $10,000 capital stock, by Gordon W. MacDougall, Lawrence Macfarlane and Adrian Knarchibull-Hugessen, of Montreal, and others.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery April 1.)

Bessemer, valley	$18.00
Bessemer, Pittsburgh	18.95
Basic, Pittsburgh	16.95
Basic, eastern Pa.	17.75 to 18.00
Malleable, Pittsburgh	17.95
Malleable foundry, Chicago	18.00
Malleable foundry, Philadelphia	19.00 to 19.50
Malleable foundry, Buffalo	18.00 to 19.00
No. 1X foundry, Philadelphia	18.25 to 18.50
No. 2 foundry, Pittsburgh	17.95
No. 2 fdy., first half, Pbgh.	15.95 to 16.45
No. 2 foundry, first half, valley	15.00 to 15.50
No. 2 foundry, Cleveland	17.30
No. 2 foundry, Ironton	16.50 to 17.00
No. 2 foundry, Chicago	18.00
No. 2X foundry, Philadelphia	17.75 to 18.25
No. 2X fdy., N. J. tidewater	17.75 to 18.25
No. 2X foundry, Buffalo	17.50 to 18.50
No. 2 plain, Philadelphia	17.50 to 17.75
No. 2 plain, N. J. tidewater	17.50 to 17.75
No. 2 plain, Buffalo	17.00
No. 2 southern, Birmingham	13.50 to 14.00
No. 2 southern, Cincinnati	16.40 to 16.90
No. 2 southern, Chicago	17.50 to 18.00
No. 2 southern, Phila. delivery	17.50 to 18.00
No. 2 southern, Cleveland	17.50 to 18.00
No. 2 south'n, New York docks	17.50 to 18.00
No. 2 southern Boston, docks	16.75 to 17.25
No. 2 south. interior, New Eng.	18.00 to 19.00
No. 2 southern, St. Louis	17.20 to 17.70
Virginia No. 2X furnace	15.50 to 16.00
Virginia 2X, Philadelphia	18.25 to 18.75
Virginia 2X, Jersey City	18.50 to 19.00
Virginia 2X, Boston points	18.75 to 19.25
Gray forge, eastern Pa.	17.25 to 17.75
Gray forge, Pittsburgh	17.45
Gray forge, Birmingham	10.50
Silveries, 8 per cent, Jackson, O.	24.00
Silveries, 8 per cent, Chicago	25.50 to 26.50
Standard low phos., Phila.	30.00 to 31.00
Lebanon low phos., furnace	26.00 to 28.00
Low phos., Pittsburgh	30.00 to 31.00
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	18.75 to 19.25
Charcoal, Buffalo	19.00 to 20.00
Charcoal, Birmingham	21.50

IRON ORE

Lake Superior Ores.
(Lower Coke Reports.)

Old range Bessemer, 55 per cent.	$3.75
Mesabi Bessemer, 55 per cent.	3.45
Old range, non-Bess., 51½ per cent.	3.00
Mesabi non-Bessemer, 51½ per cent.	2.80

Foreign Ores.
(Per unit Philadelphia.)
(Prices nominal.)

Foreign Bess., 50 to 65 per cent.	8 to 8½
For'n non-Bess., 50 to 65 per cent.	8 to 8½

COKE

(At the ovens.)

Connellsville furnace	$2.25
Connellsville fur., first half.	2.35 to 2.50
Connellsville foundry	3.00 to 3.25
Connellsville fdy. contr.	3.00 to 3.25
Wise county furnace	2.75 to 3.00
Wise county foundry	3.00 to 3.25
Pocahontas furnace	2.75 to 3.00
Pocahontas foundry	3.00 to 3.25
New River, foundry	3.25 to 3.75
New River, furnace	3.00 to 3.25

FERRO ALLOYS AND STEEL MAKING METALS

Ferro mang., delivered (prompt)	100
Ferro mang., Balti., (future)	100.00
Spiegeleisen 20 per cent, furnace	28.00
Ferro-silicon, 50 per cent, Pbgh.	83.00 to 85.00
Ferro-silicon, 50 per cent, Phila.	83.00 to 85.00

Bessemer ferro-silicon, 9 per cent to 10 per cent, $25.00 to $26.00; 10 to 11 per cent, $26.00 to $27.00; 11 to 12 per cent, $27.00 to $28.00; 12 to 13 per cent, $28.00 to $29.00 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-chrome, 4 to 6 per cent carbon, 25 cents per pound; 2 per cent carbon, 45 cents per pound, delivered.

Ferro-vanadium, $3.15 per pound of contained alloy, Pittsburgh.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

Nickel, 50 to 55 cents per pound.

Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

From New York	$0.40
From Pittsburgh	.619
From Youngstown	.619
From Niles	.619
From Wheeling	.619
From Steubenville	.619
From Johnstown	.604
From Coatesville	.545
From Steelton	.555
From Bethlehem	.529
From Cleveland	.65
From Chicago	.765

Ferro-tungsten, nominal.

Cobalt metal, nominal, Pittsburgh.

Aluminum, 59 to 60 cents per pound, New York.

Ferro-molybdenum, Pittsburgh, nominal.

SEMI-FINISHED STEEL

Open hearth billets, Phila.	$34.00 to 36.00
Bessemer billets, Phila.	28.00
Forging billets, Phila.	45.00 to 50.00
Forging billets, Pbgh.	40.00
Forging billets, Chgo.	32.00 to 34.00
Wire rods, Pittsburgh (nom.)	37.00
Bess. bill., Youngstown	28.00 to 30.00
Open hearth billets, Youngstown	30.00
Bessemer billets, Pittsburgh	28.00 to 30.00
Open hearth billets, Pittsburgh	30.00
Bess. sheet bars, Youngstown	30.00
Op. h'th sheet bars, Youngstown	30.00
Bess. sheet bars, Pittsburgh	30.00
Op. h'th sh. bars, Pbgh.	30.00
Muck bar, Pittsburgh (nominal)	31.00 to 32.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh. & Chg.	1.25c
Stand. op-h'th rails, Pbg. & Chg.	1.34c
Light rails 8 to 10 lbs., Pbgh.	1.60c
Light rails, 8 lb. Chgo.	1.49c
Light rails 12 to 14 lbs. Pbgh.	1.55c
Light rails, 12 lbs. Chgo.	1.44c

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brookyln (by canal)	1.25 to 1.60
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky	2.65
New York (all rail)	6.15
New York (rail and water)	4.25
Philadelphia (all rail)	5.20
Philadelphia (rail and water)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

Light rails 16 to 20 lbs., Pbgh.	1.50c
Light rails 16 to 20 lbs., Chgo.	1.39c
Light rails 25 to 45 lbs., Pbgh.	1.45c
Light rails 25 to 45 lbs., Chgo.	1.34c
Relaying rails, standard, Pbgh. & Chgo.	$23.00 to 24.00
Relaying rails, light, Chgo.	21.50 to 22.50
Angle bars, st. sect., Pbgh. base.	1.50c to 1.75c
Angle bars, st. sections, Chicago	1.50c to 1.75c
Spikes, railroad, Pbgh.	2.00c
Spikes, railroad, Chgo.	2.00c to 2.10c
Track bolts, Pbgh.	2.50c
Track bolts, Chgo.	2.50c to 2.60c
Tie plates, Chgo.	34.00 to 35.00

SHAPES, PLATES AND BARS

Structural shapes, Pbgh.	1.70c to 2.00c
Structural shapes, Chgo.	1.89c to 1.99c
Structural shapes, Philadelphia	1.859c to 1.959c
Structural shapes, New York.	1.869c to 1.969c
Struc. shapes, San Francisco.	2.00c to 2.05c
Tank plates, Chgo.	1.89c to 1.99c
Tank plates, Pittsburgh.	1.70c to 2.00c
Tank plates, Philadelphia.	1.859c to 2.159c
Tank plates, New York.	1.869c to 2.169c
Bars, soft steel, Pittsburgh.	1.70c to 2.00c
Bars, soft steel, Chgo.	1.89c to 1.99c
Bars, soft steel, Philadelphia.	1.859c
Bars, soft steel, New York.	1.869c
Hoops, carloads, Pittsburgh.	1.90c
Bands, Pittsburgh	1.70c
Shafting, Pbgh., contr. carloads	50 to 52 off
Bar iron, Chgo.	1.60c
Bar iron, Philadelphia.	1.759c to 1.859c
Bar iron, New York.	1.769c to 1.869c
Bar iron, Cleveland.	1.60c to 1.65c
Bar iron, Pittsburgh.	1.70c
Hard steel bars, Chicago.	1.60c
Smooth fin., mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh.	2.50c to 2.75c
No. 28, black, Chgo.	2.69c to 2.94c
No. 28, tin mill, black, Pbgh.	2.45c
No. 28, galvanized, Pbgh.	4.75c to 5.25c
No. 28, galvanized, Chgo.	5.19c
No. 10, blue anl., Pbgh.	2.10c to 2.20c
No. 10, blue annealed, Phila.	2.359c
Tin plate, 100 lb., coke base.	$3.60

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pickled, cold roll. and re-anl.	30 cents
Hot roll'd pick'd and anl., tin mill.	25 cents
Full pickl'd, cold rolled and re-anl.	50 cents
Auto sheets	75 cents
Blued stove pipe stock	10 cents
Range steel	30 cents
Re-squaring	10 cents
Roller leveling	10 cents
Patent leveling and re-squaring	35 cents
Oiling sheets	10 cents
Deoxiding	10 cents
Lime finish	10 cents
Open-hearth stamping steel, free fr. mill scale	55 cents
Special open hearth deep stpg. steel free from mill scale	80 cents
Extra deep special auto body stock.	$1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents

No reduction for sheets not annealed.

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black. Butt-weld.	Galv. Butt-weld.
Steel, ⅜ to 3 inches	78	63½
Iron, ¾ to 2½ inches	70	52
	Lap-weld.	
Steel, 2½ to 6 inches	77	62½

BOILER TUBES

Steel, 3½ to 4½ inches l. c. l.	69
Iron, 3½ to 4½ inches l. c. l.	57

WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotation.)

Wire nail jobbers, Pittsburgh	$1.90
Plain wire, jobbers, Pittsburgh	1.75
Galvanized wire, jobbers, Pbgh.	2.45
Polished staples, Pbgh.	2.05
Galvanized staples, Pbgh.	2.75
Barb wire, painted, jobbers, Pbgh.	2.05
Barb wire, galv., jobbers, Pbgh.	2.75

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled threads, 75; cut threads 70 and 10; larger or longer, 65 and 5.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller or shorter, rolled 75, and 5; cut, 75; larger or longer, 65, 10 and 5.

Gimlet and cone point lag bolts, 75 and 15.

Hot pressed square, blank or tapped nuts, $5.00 off list; hot pressed hexagon blank or tapped, $5.30.

Cold pressed square, blank or tapped, $4.50 off; hexagon, blank or tapped, all sizes, $5.70.

RIVETS

Structural rivets, Pbgh	2.40c
Structural rivets, Chgo. delivery	2.55c
Boiler rivets, Pbgh	2.50c
Boiler rivets, Chgo. delivery	2.65c

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.50c to 1.55c

COLD ROLLED STRIP STEEL

(Subject to regular extras.)

0.10 to 0.19 Carbon. 1½ inch and wider.	Base price Cut to length Hard.	Soft.
0.100 and thicker	3.60	3.85
0.050 to 0.099 inc	3.70	3.95
0.035 to 0.049 inc	3.85	4.10
0.031 to 0.034 inc	4.20	4.50
0.025 to 0.030 inc	4.35	4.75
0.020 to 0.024 inc	4.55	4.95
0.017 to 0.019 inc	5.45	5.95
0.015 and 0.016	5.85	6.35
0.013 and 0.014	6.70	7.20
0.012	7.30	7.80
0.011	7.65	8.15
0.010	8.00	8.50
	Coils.	
0.100 and thicker	3.50	3.75
0.050 to 0.099 inc	3.55	3.80
0.035 to 0.049 inc	3.70	3.95
0.031 to 0.034 inc	3.85	4.25
0.025 to 0.030 inc	3.95	4.35
0.020 to 0.024 inc	4.05	4.45
0.017 to 0.019 inc	4.25	4.85
0.015 and 0.016	4.75	5.25
0.013 and 0.014	5.45	5.95
0.012	5.80	6.30
0.011	6.15	6.65
0.010	6.50	7.00

CAST IRON WATER PIPE

Four-inch, Chicago	29.00
Six-inch and larger, Chicago	27.00
Six inch Class B, New York	26.00 to 26.50
Four-inch, Class B, New York	29.00 to 29.50
Four-inch, Birmingham	24.00
Six-inch and larger, Birmingham	22.00

Light weight water and gas pipe, $1 per ton higher than standard water.

WAREHOUSE PRICES

Steel bars, Chicago	2.20c
Steel bars, 2-in. and over, Cleve.	2.65c
Steel bars, under 2-in., Cleveland	2.40c
Steel bars, Cincinnati	2.40c
Steel bars, Philadelphia	2.30c to 2.40c
Steel bars, New York	2.35c to 2.45c
Steel bars, St. Louis	2.15c
Steel bars, St. Paul	2.20c
Steel bars, over 2-inch, Buffalo	2.35c
Steel bars, Buffalo	2.20c
Iron bars, Chicago	2.20c
Iron bars, Cleveland	2.35c
Iron bars, St. Louis	2.10c
Iron bars, Cincinnati	2.20c
Iron bars, Philadelphia	2.20c to 2.30c
Iron bars, New York	2.25c to 2.30c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	2.20c
Shapes and plates, Cleveland	2.40c
Shapes and plates, Buffalo	2.35c
Shapes and plates, Cincinnati	2.35c
Shapes and plates, St. Louis	2.25c
Shapes and plates, Philadelphia	2.30c to 2.40c
Shapes, New York	2.40c
Plates, New York	2.50c
Shapes and plates, St. Paul	2.30c
No. 10 blue anl. sheets, Chgo	2.60c
No. 10 blue anl. sheets, Clevel'd	2.65c
No. 10 blue an'l'd sheets, Buffalo	2.10c
No. 10 blue anl. sh. St. Louis	2.45c
No. 10 blue anl. sheets, Cinci	2.50c
No. 10 blue anl. sheets, St. Paul	2.50c
No. 28 black sheets, Chgo	2.75c
No. 28 black sheets, Cleveland	2.95c
No. 28 black sheets, Cincinnati	2.70c
No. 28 black sheets, St. Louis	2.80c
No. 28 black sheets, St. Paul	2.80c
No. 28 galv. sheets, Chgo	4.70c
No. 28 galv. sheets, Cleveland	5.25c
No. 28 galv. sheets, Cincinnati	5.00c
No. 28 galvanized sheets, St. L.	4.85c

Freight Rates, Coke

Connellsville regions, per 2.000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.85
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo	$14.25 to 14.75
No. 1 railroad wrought, Cleve.	14.00 to 14.50
No. 1 railroad wrought, St. L.	12.50 to 13.00
No. 1 railroad wrought, Cinci	12.25 to 12.75
No. 2 railroad wrought, Chgo	13.75 to 14.25
No. 2 railroad wrought, St. L.	12.50 to 13.00
Arch bars and transoms, Chgo.	16.75 to 17.25
Arch bars and transoms, St. L.	15.50 to 16.00
Knuckles, coup., Chgo	14.50 to 15.00
Springs, Chgo.	15.00 to 15.50
Knuckles, coup. & spr'gs, St. L.	12.00 to 12.50
Shafting, Chgo.	16.00 to 16.50
Shafting, St. Louis	15.00 to 15.50
Steel car axles, Chicago	20.50 to 21.00
Steel car axles, St. Louis	20.50 to 21.00
Locomotive tires, Chicago	14.00 to 14.50
Locomotive tires, St. Louis	14.00 to 14.50
Cut forge, Chicago	13.75 to 14.50
Pipes and flues, Chicago	10.75 to 11.25
Pipes and flues, Clevel'd (nom.)	11.00 to 11.25

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—	
New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	73.9 cents
Pacific coast, (tin plate)	70 cents
Pacific coast, via Panama canal	61.9 cents

Pipes and flues, St. Louis	9.50 to 10.00
No. 1 cast, Chicago	13.00 to 13.50
No. 1 cast, Cleveland	12.50 to 13.00
No. 1 cast, Cincinnati	11.50 to 12.00
No. 1 cast, St. Louis	9.50 to 10.00
No. 1 busheling, Chicago	12.75 to 13.25
No. 1 busheling, Cleveland	12.75 to 13.25
No. 1 busheling, Cincinnati	10.00 to 10.50
No. 1 busheling, St. Louis	10.50 to 11.00
No. 2 busheling, Chicago	9.00 to 9.25
No. 1 boiler plate, cut, Chgo	10.50 to 11.00
No. 1 boiler plate, cut, St. L.	7.00 to 7.50
Boiler punchings, Chicago	13.00 to 13.50
Cast borings, Chicago	7.50 to 8.00
Cast borings, Cleveland	7.00 to 7.25
Cast borings, Cincinnati	7.00 to 7.50
Cast borings, St. Louis	7.00 to 7.50
Machine shop turnings, Chgo	8.00 to 8.50
Machine shop turnings, Cleveland	6.50 to 6.75
Machine shop turnings, Cinci	$ 7.00 to 7.50
Machine shop turnings, St. L.	8.00 to 8.50
Malleable agricultural, Chgo	11.50 to 11.75
Malleable agriculture, St. Louis	9.00 to 9.50
Malleable railroad, Chicago	13.50 to 14.00
Malleable, Cincinnati	8.00 to 8.50
Malleable railroad, St. Louis	11.00 to 11.50
Angle bars, iron, Chicago	16.50 to 17.00
Angle bars, iron, St. Louis	14.00 to 14.50
Angle bars, steel, Chicago	14.00 to 14.50
Angle bars, steel, St. Louis	12.00 to 12.50
Stove plate, Chicago	10.50 to 10.75
Stove plate, Cleveland	9.75 to 10.00
Stove plate, Buffalo	9.00 to 9.50
Stove plate, Cincinnati	8.00 to 8.50
Stove plate, St. Louis	9.00 to 9.50
Bundled sheet, Cincinnati	8.00 to 8.50

(Gross tons.)

Heavy melting steel, Pbgh	$17.00
Heavy melting steel, Buffalo	15.50 to 16.00
Heavy melting steel, Chicago	15.00 to 15.50
Heavy melting steel, Cleveland	15.00 to 15.50
Heavy melting steel, Cincinnati	12.50 to 13.00
Heavy melting steel, eastern Pa.	15.00 to 15.50
Heavy melting steel, New York	13.00 to 13.50
Heavy melting steel, St. Louis	13.50 to 14.00
Grate bars, Buffalo	10.50 to 11.00
Grate bars, New York	7.75 to 8.00
No. 1 railroad wrought, east. Pa.	17.50 to 18.00
No. 1 railroad wrought, Pbgh	15.50 to 16.00
No. 1 R. R. wrght., New York	14.75 to 15.00
No. 1 R. R. wrought, Buffalo	14.00 to 14.50
Shafting, New York	16.00 to 16.50
Shafting, eastern Pa.	18.50 to 19.00
Wrought pipe, New York	11.50 to 11.75
Wrought pipe, eastern Pa.	13.50 to 14.00
Mch. shop turnings, New York	8.25 to 8.50
Machine shop turnings, Buffalo	7.00 to 7.50
Mch. shop turnings, Pbgh	8.50 to 9.00
Mch shop turnings, eastern Pa.	10.00 to 10.50
Heavy axle turnings, Buffalo	11.50 to 12.00
Cast borings, New York	8.25 to 8.50
Cast borings, eastern Pa.	10.25 to 10.75
Cast borings, Buffalo	8.00 to 8.50
Cast borings, Pittsburgh	9.75 to 10.00
Stove plate, N. J. points	10.50 to 10.75
Stove plate, Pittsburgh	9.50 to 10.00
Stove plate, eastern Pa.	11.00 to 11.50
Shoveling steel, Chicago	14.75 to 15.00
Shoveling steel, St. Louis	12.50 to 13.00
Reroll. rails, 5 ft. & ov., Pbgh	16.75 to 17.00
Reroll. rails, 5 ft. & ov., Chgo	15.50 to 16.00
Reroll. rails, 5 ft. & ov., Cleve.	15.00 to 15.25
Reroll. rails, 5 ft. & ov., E. Pa.	16.75 to 17.25
Reroll. rails, 5 ft. & ov., St. L.	15.00 to 16.00
Steel rails, short, Chicago	15.50 to 16.00
Steel rails, short, Cleveland	17.00 to 17.25
Steel rails, short, St. Louis	13.50 to 14.00
Iron rails, Cleveland (nom.)	16.00 to 16.50
Iron rails, Chgo.	15.75 to 16.25
Iron rails, Buffalo	16.00 to 16.50
Iron rails, Cincinnati	14.00 to 14.20
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Iron axles, Cincinnati	20.50 to 21.00
Iron axles, eastern Pa.	23.00 to 24.00
Iron axles, Chicago	22.00 to 22.50
Iron axles, Buffalo	21.00 to 21.50
Iron axles, St. Louis	15.00 to 15.50
Steel car axles, New York	19.00 to 20.00
Steel car axles, Buffalo	20.00 to 21.00
Steel car axles, Cleveland	22.00 to 23.00
Steel car axles, eastern Pa.	21.00 to 22.00
No. 1 busheling, Buffalo	12.50 to 13.00
No. 1 busheling, Pittsburgh	9.75 to 10.00
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Low phos. steel, Buffalo	19.50 to 20.00
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Low phos. steel, eastern Pa.	20.00 to 20.50
No. 1 forge, eastern Pa.	12.00 to 12.50
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No. 1 heavy cast. N. J. points	12.75 to 13.00
Mall. railroad, Cleveland	15.00 to 16.00
Malleable railroad, Pittsburgh	13.50 to 13.75
Malleable railroad, Buffalo	14.00 to 14.50
Malleable railroad, eastern Pa.	13.00 to 13.50
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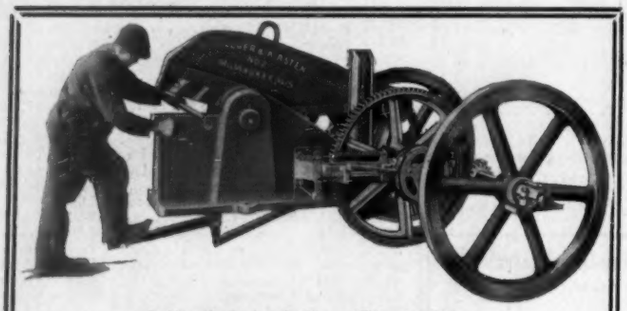

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How to Heat Wire Rods by Continuous Coil Method

(*Continued from Page* 1086.)

in parallel rows at one end of the cleaning room. These barrels are filled from an overhead hopper which is commanded by a crane. The barrels discharge by gravity into trucks which run on a track between the two rows of barrels. One man operates the crane, keeps the hoppers supplied with stock and empties the tumbled product into storage bins. Another man is stationed on the top of the barrel platform and supervises their loading and unloading. The third man works on the floor of the cleaning room and handles the empty and loaded cars in and out from between the tumbling barrels. All of the tumbling barrels are enclosed, and the room is remarkably free from dirt and noise.

The rolling mill building is 385 x 80 feet and is of steel and brick construction. It is commanded by a 15-ton crane. There are two stands of three-high, 14-inch roughing rolls, and five stands of 10-inch finishing rolls, four stands being three-high and one stand two-high. The roughing rolls are driven by a 300-horsepower direct current variable speed motor. The finishing train is driven by a 400-horsepower direct current variable speed motor. Through chutes in front of the finishing stands, the rods are run either onto the 130-foot cooling beds or to any one of five headers, where they are headed direct off the mill heat. There are two gas-fired heating furnaces in the rolling mill, each having a 20 x 7-foot hearth. A six-pot rod annealer is located opposite the entrance from the rod mill cleaning house. Both the annealer and the heating furnaces are charged by the overhead crane. The rods are rolled from billets or box pile scrap into flats or rounds from ⅜-inch to 1½ inches.

At one side of the rolling mill is the motor room which is separated from the mill by steel and glass dustproof partitions. Two mill motors are located in this room. There is a 750-kilowatt motor-generator set which changes the current from alternating to direct. The current is led into the plant at 4,400 volts and is stepped down to 250 volts. The air blowers for the mill furnaces also are in this room. These blowers are driven by two 15-horsepower induction motors. A 10-ton hand crane runs overhead. This crane also serves the roll turning department located outside of the mill.

The Buffalo Bolt Co. employs about 850 men. The plant is located on a site of 17½ acres, giving ample room for expansion. A warehouse, 330 x 250 feet permits the carrying of a large stock of finished material. This stock ordinarily is about 7,500 tons. The raw material carried in stock under ordinary conditions is 5,000 tons.

Iron Deposits of Brazil

Although geographically nearly as large as the United States and in many places highly mineralized, Brazil is almost unexploited as a mining proposition. The mining laws of the country have recently been remodeled in a manner that provides a decided step toward modernization and practical applicability, but this legislation will not overcome the lack of transportation facilities from the interior and the high cost of freights and of labor, which have hitherto been obstacles sufficient to keep the truly great mineral resources of the republic almost untouched. Of Brazil's iron ores, the hematites are in Minas Geraes, Matto Grosso, Goyaz and Bahia; the magnetites (some titaniferous) in Sao Paulo, Parana, Santa Catharina and

Rio Grande do Sul. The most important deposits by far are those of the state of Minas Geraes.

Through the central part of Minas Geraes extends the Serra de Espinhaco in a northerly-southerly direction. In this range of mountains are found nearly all of the mineral deposits of the state. The great iron area seems really to be within a well-defined rectangle, 56 miles long by 37 miles wide, with Burnier on the south side, Sabara on the north side, and Santa Barbara and Marianna on the east. In addition to the ores within this rectangle, scattered deposits extend northerly toward Diamentina, so that the high-grade iron-bearing formations probably occupy an area of some 2,200 square miles. If the lower-grade deposits are also considered, the area will be doubled in extent.

Three railroads either tap or are projected to tap this district. The most important is the government-owned line, the Central railway, which enters the iron area near its southwestern limit at Burnier and extends northward to Sabara. It also has branches extending from Burnier to Marianna and from Sabara to Santa Barbara. From Rio de Janeiro, the nearest seaport, to Burnier, is about 370 miles, and to this point the road is broad gage (5.25 feet), while from Burnier to the other points the road is reduced in gage to 3.28 feet. Another railroad, the English-owned Leopoldina, does not enter this main rectangle, but is built to tap the deposits at Itabirra de Matto Dentro, north of the rectangle. Its seaport is also Rio de Janeiro, and the distance from Rio to Itabirra is about 390 miles. Still another railroad, French owned, is partially constructed to operate between the seaport Victoria and Itabirra de Matto Dentro, a distance also of about 390 miles.

Classification of Ores

The ores may be classified as follows:

I. Bedded ores.—(a) Very thick, bedded, massive, hematite, including the dense, hard blue and the fine and coarse specular varieties and martite. Beds are up to 300 feet in width and a mile in length. (b) Thin bedded laminated hematite, fine grained or crystalline, hard and soft. Beds not so wide as (a), but have great length.

II. Fragmental ores.—(a) Canga, a conglomerate of hematite pebbles cemented together with limonite. (b) Extensive beds of hematite "float" (rubble). (c) Sand ore; "float" mixed with sands in river bottoms and elsewhere.

III. Secondary ores, carbonates, etc.

The important ores commercially are the bedded hematites, both thick and thin, the Canga conglomerates, and the rubble ores. In order to give some idea of the extent of the deposits, the Servico Geologico do Brazil selected nine of the largest and entirely exposed deposits and computed the cubic contents of each separately. These are of the bedded (highest grade) type, and are not assumed to have an extension below the surface of the surrounding country. On this basis they gave an estimated tonnage of 988,000,000. Dr. Orville Derby, the director of the geological service, thinks this figure can conservatively be doubled, which tonnage about equals the total reserve of the Lake Superior ores today.

In addition to this tonnage, which includes the highest grade ore only, there are known to exist millions of tons of the lower grade Canga and rubble ores. One deposit of rubble is estimated to contain 20,000,000 tons, while the Canga ores, running higher than 50 per cent iron, would perhaps total 1,710,000,000 tons.

In Austria-Hungary the production of electric steel in 1914 was 19,844 tons and of crucible steel 17,557 tons, making a total of 37,401 tons of both crucible and electric steel. Of the electric steel output, 9,037 tons, or over 45 per cent, were produced in induction furnaces. The production of electric steel in Girod furnaces cannot be given because these units also are used in government plants.

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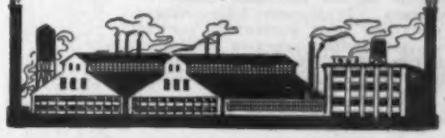

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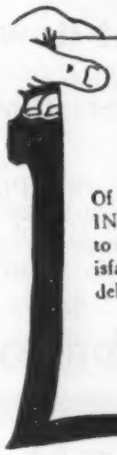

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